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Opuscula Philolichenum

small works in the field of lichenology

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MISSION

Opuscula Philolichenum is intended to serve as a venue for the publication of small works in the field of lichenology (including lichenicolous fungi and non-lichenized fungi traditionally treated with lichens). The central goal of the journal is to provide timely publication, in a professional format, free of charge to authors and readers. While the journal focuses on topics relating to the lichen biota of North America this is by no means exclusive and manuscripts on other topics will be considered as the table of contents of the present issue clearly illustrates.

Authors wishing to submit a manuscript for publication in *Opuscula Philolichenum* should contact the editor prior to submission to confirm that the paper conforms to the mission of the journal (outlined above). Manuscript submissions should be left unformatted and authors should consult a recent issue of *Opuscula Philolichenum* for style. All submissions are subjected to review by at least two peer reviewers and, following acceptance are formatted by the editor.

NOTICE FROM THE EDITOR

When this journal began publication nine years ago it was among the first serials to take advantage of the internet when publishing new botanical nomenclatural acts. The journal was conceived as a primarily electronic one, available on-line free of charge (at http://sweetgum.nybg.org/philolichenum/), with a limited print run to satisfy the requirements for effective publication established under the *International Code for Botanical Nomenclature*. Since that time we have continued to publish the journal in this manner, printing one or two issues a year, with each issue consisting of between one and two hundred pages.

In 2004 we could not have foreseen the revolutionary changes that took place at the 18th International Botanical Congress in Melbourne. There the Nomenclature Section voted to allow electronic only publication of new nomenclatural acts beginning 1 January 2012. In response to this change *Opuscula Philolichenum* no longer produces hardcopy. Although a single printed copy will continue to be deposited in the library of The New York Botanical Garden.

Beginning with this volume (number 11) of *Opuscula Philolichenum*, manuscripts will be published electronically on-line in PDF/A format immediately following the approval of the authors in the post-review proof stage. The PDF issued online is considered to be the final version (= version of record) and the date on which the PDF is posted is considered to be the date of effective publication. In order to aid future workers the date of effective publication for each manuscript is provided in the table of contents. When a new manuscript is published online a record is also simultaneously transmitted to the organizers of *Recent Literature on Lichens* for inclusion in that database.

THANKS TO OUR REVIEWERS

As with all previous issue of *Opuscula Philolichenum* the backbone of a journal is its cohort of reviewers. Therefore we take this opportunity to thank those researchers who have generously agreed to review manuscripts submitted for consideration in the journal in 2012: Alan Archer – Sydney, Australia; Sean Beeching – Atlanta, Georgia, U.S.A; Irwin Brodo – Ottawa, Ontario, Canada; Stephen Clayden – St. Johns, New Brunswick, Canada; Pradeep Divakar – Madrid, Spain; Kendra Driscoll – St. Johns, New Brunswick, Canada – John Elix – Canberra, Australia; Theodore Esslinger – Fargo, North Dakota, U.S.A.; Richard Harris – Bronx, New York, U.S.A.; David Hawksworth – Madrid, Spain & London, U.K.; James Hinds – Orono, Maine, U.S.A.; Brendan Hodkinson – Philadelphia, Pennsylvania, U.S.A.; Per Magnus Jørgensen – Bergen, Sweden; Kerry Knudsen – Riverside, California, U.S.A.; Martin Kukwa – Gdansk, Poland; Douglas Ladd – St. Louis, Missouri, U.S.A.; Thorsten Lumbsch – Chicago, Illinois, U.S.A.; Bruce McCune – Corvallis, Oregon, U.S.A.; Heath O'Brien – Toronto, Ontario, Canada; Yoshihito Ohmura – Tokyo, Japan; Zdenek Palice – Průhonice, Czech Republic; David Richardson – Halifax, Nova Scotia, Canada; Dirk Rodriguez – Ventura, California, U.S.A.; Martin Westberg – Stockholm, Sweden; Mikhail Zhurbenko – St. Petersburg, Russia.

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Notice of the formation of the *International Committee for the Nomenclature of Lichens and Allied Fungi* (ICNLAF)

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ABSTRACT. – Notice is given regarding the formation of the *International Committee for the Nomenclature of Lichens and Allied Fungi* (or ICNLAF). The ICNLAF is an independent committee focused on the nomenclature of lichenized and allied fungi. The committee has no official authority to adjudicate matters of nomenclatural dispute and governance. It stands ready to consult with the other bodies on such matters however, and will accept such responsibility if mandated to do so by IAPT and the authorities that govern the ICN. In the event that the committee is charged by IAPT to govern lichen nomenclature, the ICNLAF will formally become active and the membership expanded to include appropriate equality in geographical and taxonomical representation.

INTRODUCTION

Recently, the Nomenclature Section of the 18th International Botanical Congress (IBC) was held in Melbourne, Australia. A remarkably diverse body of nearly three hundred botanists and mycologists attended the section to discuss, debate, and ultimately vote on, numerous proposed changes to the *International Code for Botanical Nomenclature* (now called the *International Code of Nomenclature for algae, fungi, and plants*). As has been noted elsewhere, a large number of these proposals specifically addressed the needs of the mycological community (Norvell 2011, Lendemer 2011). Among the issues debated in Melbourne was a series of proposals designed to integrate the Nomenclature Committee for Fungi (NCF), whose members are appointed by the IBC/IAPT, with independent fungal committees such as the International Commission for the Taxonomy of Fungi (ICTF), whose members are invited by that commission rather than by IBC/IAPT. Although the spirit of collaboration displayed in these proposals was accepted in Melbourne, there was an understandable reluctance to enshrine a non-IBC/IAPT appointed body into the ICN.

It was nonetheless clear that there exists a strong desire within some corners of the mycological community for more involvement in the governance of the nomenclature of fungi. Specifically, there is a desire to establish special committees comprised of taxonomists who focus on specific fungal groups. The

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goal of these groups would be to assemble a body of specialists whom could provide guidance, and advice, on nomenclatural matters relevant to each group of fungi. In response to this call to action by the ICNF we were motivated to form such a committee for lichenized and allied fungi. This committee is named *International Committee for the Nomenclature of Lichens and Allied Fungi* or ICNLAF. Below we provide a brief explanation of the historical and modern events that have led to the scope and creation of this committee. This contextual statement is followed by a brief outline of the statutes governing the committee. It is important to state clearly that we recognize at present that the ICNLAF has no formal authority to adjudicate matters of nomenclatural dispute and governance. Thus the committee as formed here, merely represents a group of lichenologists with an interest in nomenclature and the maintenance of nomenclatural stability. It is also important to state that we do not desire authority to be delegated by the IBC/IAPT. Nonetheless should authority for nomenclatural governance of certain taxonomic groups be partially or completely delegated to special committees by the IBC we stand ready to consult with these bodies and accept official responsibilities if mandated to do so. In the event that this occurs, the ICNLAF will become formally active and the membership revised and expanded to include equality in geographical and taxonomic representation (for further details, see below).

CONTEXT FOR THE ESTABLISHMENT OF THE COMMITTEE

It is widely known and well established that lichens represent a subset of fungi that have adopted a lifestyle involving the capture and propagation of an alga for the purposes of obtaining nutrition. Living as we do at beginning the twenty-first century, it is easy to forget that a little over one hundred years ago, the debate over whether lichens are fungi was fierce and strong (with many lichen taxonomists opposing this view). The community eventually did accept that lichens are fungi. Nonetheless it was only research in recent decades that conclusively dispelled the notion that these organisms represent a monophyletic group and dispersed them across the many taxonomic groups that comprise Fungi.

Perhaps given the above, it is not surprising that the historical divide that separated lichens from other fungi persists today in the taxonomic community, despite the fact that the organisms have been fully integrated into the fungal phylogeny. Indeed, lichenologists represent a distinct subset of the mycological community whom, for the most part, concern themselves with the taxonomy and systematics of groups that were traditionally treated as lichens, regardless of the true biology of the organisms. After all, many groups traditionally treated as lichens include non-lichenized members (e.g., *Arthonia* s.l.), and some even consist entirely of non-lichenized taxa (e.g., Mycocaliciaceae). These non-lichenized taxa have, for the most part, never been treated by traditional mycologists, but rather have been considered the domain of the lichenological community. Interestingly, even lichenicolous fungi, the vast majority of which are non-lichenized and belong to groups never traditionally considered lichens, have largely been treated by lichenologists.

Clearly, although lichens are not a monophyletic group, the evidence of a discrete lichenological community within the broader mycological one is manifold. There are many regional lichenological societies in addition to the *International Association of Lichenologists* (IAL). There is an array of journals whose entire contents pertain to lichens and lichenicolous fungi (e.g., *Bibliotheca Lichenologica, The Lichenologist, Lichenology, Opuscula Philolichenum*). The field even has its own literature indexing system, *Recent Literature on Lichens* or RLL, a system that has yet to be implemented in other areas of mycology. All of these factors support the notion that lichenologists should be responsible for the governance of the nomenclature of the organisms they study. For these reasons we have proposed the formation of the ICNLAF, which will be governed by the statutes outlined below if mandated to do so by the IBC/IAPT, NCF, or ICTF.

FORMATION OF THE INCLAF

1. **Definition**. – The International Committee for the Nomenclature of Lichens and Allied Fungi (ICNLAF) is an independent body of lichenologists concerned with matters of nomenclature and nomenclatural stability for names of lichens and allied fungi.

2. **Scope**. – The taxonomic scope of the ICNLAF includes all groups of lichens and allied fungi as outlined by Hodkinson (2012). Recognizing that lichens are not a monophyletic entity, when dealing with certain

groups, such as those with non-lichenized members or those belonging to the basidiomycetes, the ICNLAF will consult with other relevant bodies as it is mandated to do so.

3. **Objective**. – The objective of the ICNLAF is to assemble a body of lichenologists to whom the NCF and INCF can refer matters of governance of the nomenclature of lichens and allied fungi.

4. **Membership and governance**. – As the ICNLAF has not been sanctioned by IBC/IAPT or NCF to adjudicate nomenclatural matters, the committee is presently an informal grouping. The formal rules for membership and governance will be established in consultation with the mandating body (e.g., IAPT) as well as the International Association of Lichenologists (IAL) when the committee is formally recognized.

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An evolving phylogenetically based taxonomy of lichens and allied fungi

BRENDAN P. HODKINSON[1]

ABSTRACT. – A taxonomic scheme for lichens and allied fungi that synthesizes scientific knowledge from a variety of sources is presented. The system put forth here is intended both (1) to provide a skeletal outline of the lichens and allied fungi that can be used as a provisional filing and databasing scheme by lichen herbarium/data managers and (2) to announce the online presence of an official taxonomy that will define the scope of the newly formed International Committee for the Nomenclature of Lichens and Allied Fungi (ICNLAF). The online version of the taxonomy presented here will continue to evolve along with our understanding of the organisms. Additionally, the subfamily Fissurinoideae Rivas Plata, Lücking and Lumbsch is elevated to the rank of family as Fissurinaceae.

KEYWORDS. – higher-level taxonomy, lichen-forming fungi, lichenized fungi, phylogeny

INTRODUCTION

Traditionally, lichen herbaria have been arranged alphabetically, a scheme that stands in stark contrast to the phylogenetic scheme used by nearly all vascular plant herbaria. The justification typically given for this practice is that lichen taxonomy is too unstable to establish a reasonable system of classification. However, recent leaps forward in our understanding of the higher-level classification of fungi, driven primarily by the NSF-funded Assembling the Fungal Tree of Life (AFToL) project (Lutzoni et al. 2004), have caused the taxonomy of lichen-forming and allied fungi to increase significantly in stability. This is especially true within the class Lecanoromycetes, the main group of lichen-forming fungi (Miadlikowska et al. 2006).

Published here is a higher-level classification of lichens and allied taxa that synthesizes information from various types of analyses. This scheme is adapted from the system currently in use at the New York Botanical Garden (NY), which houses one of the few lichen herbaria in the world to have specimens filed phylogenetically. While taxonomic assignments are based on published data, reason and logic were used in assessing these data, and some taxonomic shifts have been made even when authors neglected to explicitly state their necessity. Thus, this work attempts to achieve a synthesis of our current knowledge of the higher level systematics of lichenized fungi through critical evaluation of the literature. This approach differs markedly from the one used to compile other higher level organizational schemes that include lichen-forming fungi.

The outline presented below is available online (http://sweetgum.nybg.org/lichens/), and will be continually updated as our understanding of the organisms changes. This scheme (with the worldwide checklist of lichenicolous fungi as a supplement; http://www.lichenicolous.net/; Lawrey & Diederich 2011) represents the scope of the fungal taxa within the domain of the newly-established International Committee for the Nomenclature of Lichens and Allied Fungi (ICNLAF); for taxa containing both lichens and non-lichens, collaboration with other committees will take place as needed. Therefore, this work serves two purposes: (1) to provide a skeletal outline of the lichens and allied fungi that can be used as a provisional scheme by herbarium/data managers and (2) to announce the online presence of an evolving taxonomic system that defines the intended scope of the ICNLAF.

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TAXONOMY

In this publication, taxa that are known to be closely related are placed closer to one another, with alphabetical listing generally used only when relationships between taxa cannot be inferred with confidence based on the data at hand. Portions of the outline that differ from recent taxonomic compilations (e.g., Lumbsch & Huhndorf 2010, Smith et al. 2009) are generally annotated with citations from publications that suggest the placement given here. While the outline contains several of the main groups of ascomycetous lichenicolous fungi, many families containing members with this lifestyle are not represented; for a phylogenetically-arranged list of these fungi, please refer to the worldwide checklist of lichenicolous fungi online (http://www.lichenicolous.net/; Lawrey & Diederich 2011). For a list of the genera in each of the ascomycetous families outlined below, refer to Lumbsch and Huhndorf (2010), and for the full higher-level fungal classification into which the taxa are interleaved, see Hibbett et al. (2007).

Phylum **ASCOMYCOTA**
Subphylum **PEZIZOMYCOTINA**

Class **ARTHONIOMYCETES**
- Arthoniales
  - Chrysothricaceae
  - Arthoniaceae
  - Roccellaceae

Class **DOTHIDEOMYCETES**
- Subclass Dothideomycetidae
  - Capnodiales
    - Antennulariaceae
- Subclass Uncertain
  - Patellariales
    - Patellariaceae
  - Trypetheliales
    - Trypetheliaceae
  - Order uncertain
    - Arthopyreniaceae
    - Dacampiaceae
    - Lichenotheliaceae
    - Mycoporaceae
    - Naetrocymbaceae

Class **EUROTIOMYCETES**
- Subclass CHAETOTHYRIOMYCETIDAE
  - Pyrenulales
    - Celotheliaceae
    - Pyrenulaceae
  - Verrucariales
    - Adelococcaceae
    - Verrucariaceae
- Subclass MYCOCALICIOMYCETIDAE
  - Mycocalicales
    - Mycocaliciaceae
    - Sphinctrinaceae

Class **LICHINOMYCETES**
- Lichinales
  - Gloeoheppiaceae
  - Heppiaceae
  - Lichinaceae

- Peltulaceae

Class **LECANOROMYCETES**

- Subclass ACAROSPOROMYCETIDAE
  - Acarosporales
    - Acarosporaceae
- Subclass CANDELARIOMYCETIDAE [Analyses by Miadlikowska et al. (2006) and Schoch et al. (2009) support the recognition of this as a distinct subclass.]
  - Candelariales
    - Candelariaceae
- Subclass LECANOROMYCETIDAE
  - Rhizocarpales [Analyses by Schoch et al. (2009) indicate that this represents the most basal lineage in Lecanoromycetidae, as defined here.]
    - Rhizocarpaceae
  - Lecideales [Analyses by Miadlikowska et al. (2006) and Schmull et al. (2011) support the recognition of this as a distinct order.]
    - Lecideaceae
  - Peltigerales
    - Collematineae
      - Coccocarpiaceae
      - Collemataceae
      - Placynthiaceae
      - Pannariaceae
    - Peltigerineae
      - Peltigeraceae
      - Lobariaceae
      - Nephromataceae
      - Massalongiaceae [Family established by Wedin et al. (2007).]
      - Vahliellaceae [Family established by Wedin et al. (2011).]
  - Lecanorales
    - Catillariaceae
    - Psoraceae
    - Gypsoplacaceae
    - Pilocarpaceae
    - Cladoniaceae
    - Stereocaulaceae
    - Sphaerophoraceae
    - Calycidiaceae
    - Mycoblastaceae [Including Tephromelataceae based on analyses by Miadlikowska et al. (2006).]
    - Ramalinaceae [Including Crocyniaceae and Megalariaceae based on analyses by Ekman et al. (2008).]
    - Scoliciosporaceae
    - Haematommataceae
    - Lecanoraceae
    - Parmeliaceae
    - Dactylosporaceae
    - Miltideaceae
    - Pachyascaceae
  - Teloschistales
    - Physciineae
      - Physciaceae [Including Caliciaceae based on, e.g., Schmull et al. (2011).]
    - Teloschistineae
      - Brigantiaeaceae [Placement supported by Gaya et al. (2010).]
      - Letrouitiaceae
      - Teloschistaceae

    - Megalosporaceae
- Subclass OSTROPOMYCETIDEAE
  - Sarrameanales [Order established by Hodkinson and Lendemer (2011).]
    - Sarrameanaceae
  - Pertusariales [Order merged/synonymized with Agyriales by Schmitt et al. (2010); name retained in accordance with Hodkinson and Lendemer (2011).]
    - Agyriaceae [Placement supported by Schmitt et al. (2010).]
    - Coccotremataceae
    - Icmadophilaceae
    - Megasporaceae
    - Ochrolechiaceae
    - Pertusariaceae
  - Baeomycetales
    - Anamylopsoraceae
    - Baeomycetaceae
  - Trapeliales [Order established by Hodkinson and Lendemer (2011).]
    - Trapeliaceae
  - Ostropales
    - Odontotremataceae
    - Stictidaceae
    - Coenogoniaceae
    - Porinaceae
    - Sagiolechiaceae [Family established by Baloch et al. (2010).]
    - Gyalectaceae
    - Phlyctidaceae
    - Gomphillaceae [Compositionally equivalent to Gomphilloideae (Walt. Watson ex Hafellner) Rivas Plata, Lücking and Lumbsch (Rivas Plata et al. 2012) minus Solorinellaceae; includes Asterothyriaceae based on analyses by Lücking et al. (2004) and Baloch et al. (2010).]
    - Solorinellaceae [Maintained as distinct from Gomphillaceae based on Baloch et al. (2010).]
    - Fissurinaceae comb. et stat. nov.[2] [Compositionally equivalent to Fissurinoideae Rivas Plata, Lücking and Lumbsch (Rivas Plata et al. 2012).]
    - Graphidaceae [Compositionally equivalent to Graphideae Rivas Plata, Lücking and Lumbsch (Rivas Plata et al. 2012).]
    - Thelotremataceae [Includes Ocellularieae Rivas Plata, Lücking and Lumbsch and Thelotremateae Rivas Plata, Lücking and Lumbsch (Rivas Plata et al. 2012).]
    - Myeloconidaceae
    - Phaneromycetaceae
  - Order uncertain
    - Arctomiaceae [Analyses by Schmitt et al. (2010) suggest a possible placement in Pertusariales, but further analyses are required.]
    - Arthrorhaphidaceae
    - Hymeneliaceae [According to analyses by Schoch et al. (2009), the family cannot be placed in Pertusariales or Sarrameanales, but could possibly go with Baeomycetales, Ostropales, or Trapeliales.]
    - Protothelenellaceae ('Thrombiaceae')
    - Schaereriaceae [Analyses by Schmull et al. (2011) indicate that the family is non-monophyletic and that certain members have affinities to Sarrameanales, while others appear as basal to Ostropomycetidae without support.]

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[2] **Fissurinaceae (Rivas Plata, Lücking and Lumbsch) Hodkinson comb. et stat. nov.**
Mycobank #564112.

Basionym. Fissurinoideae Rivas Plata, Lücking and Lumbsch, Fungal Diversity 52: 108. 2012. TYPE: *Fissurina* Fée.

        Thelenellaceae
  Subclass uncertain
    Umbilicariales
        Fuscideaceae [Placement supported by Miadlikowska et al. (2006).]
        Ophioparmaceae [Placement supported by Miadlikowska et al. (2006).]
        Umbilicariaceae
    Order uncertain
        Elixiaceae [Lumbsch et al. (2004) show an affiliation with Umbilicariales, but placement remains uncertain.]
        Lopadiaceae [Specific placement within Lecanoromycetes unclear based on Ekman et al. (2008).]

Class **LEOTIOMYCETES**
    Helotiales
        Helotiaceae

Class **SORDARIOMYCETES**
    Trichosphaeriales
        Trichosphaeriaceae

Class uncertain
    Order uncertain
        Aphanopsidaceae [Data generated by Lumbsch et al. (in prep.) indicate a basal position in Leotiomyceta.]
        Biatorellaceae [While some species that previously belonged to *Biatorella* have been placed within Lecanorales, the placement of *Biatorella* s. str. remains unclear.]
        Coniocybaceae
        Microcaliciaceae
        Epigloeaceae
        Lyrommataceae [Established by Lücking (2008) with uncertain placement.]
        Melaspileaceae [Based upon morphology, the group appears to be polyphyletic, containing diverse members of uncertain placement.]
        Monoblastiaceae [Analyses by Nelsen et al. (2009) support placement outside of Eurotiomycetes and suggest placement in Dothideomyceta (Dothideomycetes/Arthoniomycetes clade).]
        Sarcopyreniaceae [Placement is uncertain, although Lumbsch & Huhndorf (2010) provide Sordariomycetes incertae sedis as a best guess for *Sarcopyrenia*.]
        Strigulaceae [Analyses by Nelsen et al. (2009) support placement outside of Eurotiomycetes and suggest placement in Dothideomyceta (Dothideomycetes/Arthoniomycetes clade).]
        Thelocarpaceae [Lumbsch et al. (2009) demonstrate this family to be of uncertain placement within Pezizomycotina.]
        Vezdaeaceae [Lumbsch et al. (2009) show the family to be within Pezizomycotina, but more specific placement is unclear.]
        Xanthopyreniaceae

Phylum **BASIDIOMYCOTA**
Subphylum **AGARICOMYCOTINA**

Class **AGARICOMYCETES**
  Subclass AGARICOMYCETIDEAE
    Agaricales
        Hygrophoraceae
  Subclass uncertain
    Cantharellales
        Clavulinaceae

Corticiales
    Family uncertain (*Marchandiomphalina*)
Order uncertain
    Lepidostromataceae [Ertz et al. (2008) propose a distinct family for this group of basidiolichens.]

ACKNOWLEDGEMENTS

Richard Harris is thanked for his pioneering morphological research aimed at developing a phylogenetic scheme for lichens and allied fungi. The editorial work of James Lendemer on this issue of *OP* is also greatly appreciated. Additionally, Toby Spribille and an anonymous reviewer are thanked for helpful comments on this manuscript. The author was supported by the NSF-funded ADBC/TCN 'Lichens, Bryophytes and Climate Change' project grant ('Digitization TCN Collaborative Research: North American Lichens and Bryophytes: Sensitive Indicators of Environmental Quality and Change'; EF-1115086).

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The identity of *Hypogymnia delavayi* (Parmeliaceae) and its impact on *H. alpina* and *H. yunnanensis*

BRUCE MCCUNE[1]

ABSTRACT. – The type of *Hypogymnia delavayi*, together with the two associated specimens collected by Delavay, fit perfectly the distinctive species currently known as *H. yunnanensis*. Accordingly, *H. yunnanensis* is placed in synonymy with the older name *H. delavayi*; this species is now known only from southwest China. Many specimens representing the common subalpine to alpine ground-dwelling species in northern India and Nepal, previously placed in *H. delavayi*, are referred to *H. alpina* Awasthi. Reports of *H. delavayi* from Far East Russia belong to other species.

KEYWORDS. - China, Hengduan Mountains, Himalaya Mountains, India, Lecanorales, lichenized ascomycetes, lichenized fungi, Yunnan Province.

INTRODUCTION

The name *Hypogymnia delavayi* (Hue) Rassad. has been applied broadly in Asia. Rassadina (1956, 1971) included it in the far east Russian lichen flora as a species with narrow lobes (0.5-1 up to 4 mm wide) that are perforate below and lacking soredia and isidia. Most of this material has since been segregated as *H. sachalinensis* Tchab. & McCune (Tchabanenko & McCune 2001). The name has also been applied to the common subalpine to alpine brownish, perforate species occurring on many substrates in the Himalayas (Elix & Jenkins 1989). Studies of the type material of *H. delavayi* revealed that neither the far east Russian nor the Himalayan applications are correct. The purpose of this paper is to clarify the identity of *H. delavayi*.

MATERIALS AND METHODS

This study is based on herbarium specimens deposited in the following herbaria: BM, C, CANL, COLO, E, GZU, H, H-NYL, HMAS-L, KUN, LWG, MAF, NY, PC, S, UPS, and US, as well as specimens collected by the author. Thin-layer chromatography (TLC) was performed to detect lichen substances using standard methods of Culberson (1972). Fragments of specimens were extracted in acetone at room temperature, spotted on aluminum-backed silica gel plates (Merck 5554/7 Silica gel 60 F_{254}), run in solvent systems A and C, lightly brushed with 10% H_2SO_4, and charred in an oven at 100°C. No attempt was made to distinguish chloroatranorin from atranorin.

RESULTS

Examination of the type of *Hypogymnia delavayi* from PC revealed that it, plus the two associated specimens collected by Delavay, fit perfectly what is currently known as *H. yunnanensis* Y. M. Jiang and J. C. Wei. The morphology and chemistry of the types of these two species are the same as is described below. The older name, *H. delavayi* takes precedence and *H. yunnanensis* is here placed in synonymy with that name.

The type of *Hypogymnia yunnanensis* is from Lijiang in Yunnan Province, China and was collected at 3000 meters (*Jiang 286*, HMAS-L!). The original description of *H. yunnanensis* (Jiang & Wei 1990)

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stated that it was P- but contained physodalic acid and atranorin. TLC of the holotype of *H. yunnanensis* revealed the following compounds: atranorin and physodic, 3-hydroxyphysodic, and vittatolic acid. Thus the type of *H. yunnanensis* is chemically identical to that of *H. delavayi*.

The common saxicolous/terricolous species in India, Nepal, Tibet, and SW China that has been commonly referred to as *Hypogymnia delavayi* in the past (e.g., Awasthi 1984, Elix & Jenkins 1989) is here identified as *H. alpina* based on differences in chemistry and morphology. *Hypogymnia delavayi* has a verrucose, pale greenish gray upper surface; frequent lateral adventitious budding and pinnate branching; major lobes that are often considerably broader than thick; and it is epiphytic or on low woody substrates. In contrast, *H. alpina* has a rather smooth, dark brown upper surface (except when occurring in deeply shaded habitats, then grayer) with prominent black mottling; predominantly isotomic dichotomous to irregular branching; major lobes that are subcylindrical to cylindrical in cross section; and it is commonly terricolous or saxicolous, in addition to being epiphytic. Furthermore, the lower surface of *H. alpina* is jet black and glossy, browning only at the tips, while the lower surface of *H. delavayi* is commonly matte and pale to mid brown in a broad zone, though some specimens are mostly black below.

Hypogymnia alpina also differs greatly in habitat. *Hypogymnia alpina* occurs at high elevations, mostly above 4000 meters in the Himalayas and Hengduan Mountains. *Hypogymnia delavayi* is apparently endemic to Yunnan and Sichuan, where it is so far known from only moderate elevations (mostly 2000-3200 m). The type specimen of *H. delavayi* was collected at only 2000 meters elevation in Yunnan Province.

Although in describing *Hypogymnia alpina* Awasthi (1984) attempted to distinguish it from *H. delavayi*, his concept of *H. delavayi* clearly differed from the type, which he had not seen. His proposed differences between the newly described *H. alpina* and what he thought represented *H. delavayi* were slight, being based on the size of the apothecia and the reaction with P. Size of apothecia is an unreliable character in most *Hypogymnia* species, with small to large apothecia being commonly present on thalli of fertile species. Although Awasthi separated *H. alpina* as being P+, he also stated that P- forms exist. This agrees with my observations: by TLC 25% of 40 specimens lacked physodalic acid and gave P- spot tests.

The original specimens of *Hypogymnia alpina* were stored for a long time in Awasthi's personal herbarium but are now deposited in LWG (D.D. Awasthi pers. comm. 1998). Examination of the type of *H. alpina* confirms that the common brownish ground-dwelling species of the Himalayas is *H. alpina*.

1) *Hypogymnia alpina* D.D. Awasthi, Kavaka, 12(2): 91. 1984. TYPE: **INDIA. UTTAR PRADESH:** Uttarkashi District, Gomukh area, right bank, 6th moraine, 3750 m, on twigs of scandent shrubs, 5 July 1976, *D. D. Awasthi & S. R. Singh 8567B* (LWG!, holotype).

FIGURES 1 AND 2A .

SYNOPSIS. – Thallus loosely appressed to suberect with separate, rarely contiguous lobes; brown to dark brown, uniformly blackening or blackish mottled, lobe tips frequently perforate, lobe cavity white above and dark below or tan to gray above and below; soredia and isidia lacking.

DESCRIPTION. – Thallus to 10 cm diam, appressed to suberect; branching mostly isotomic dichotomous; lateral budding and narrow perpendicular adventitious lobes infrequent; lobes imbricate, mostly 1-2(3) mm broad, strongly inflated, separate on the thallus periphery but subcontiguous to contiguous internally; upper surface greenish gray to brown or dark brown, with black mottling or uniformly blackening, often glossy, epruinose, smooth to weakly rugose; lower surface black, usually glossy, dark brown near the lobe tips, occasionally perforate; lobe tips and axils commonly perforate, the holes lacking a differentiated rim; ceiling of lobe cavity white to grayish; floor of lobe cavity grayish to dark brown; soredia and isidia lacking; apothecia sessile to substipitate, the receptacle urn- or funnel-shaped; disk brown, to 4 mm diameter; ascospores simple, hyaline, 8/ascus, 5-10 x 4-6 µm; spermatia rod-shaped to weakly bifusiform, 4-8-6.5 x 0.5-0.7 µm.

CHEMISTRY. – Atranorin, physodic acid, +/- physodalic (75% of 40 specimens) acid, +/- protocetraric acid (always with physodalic acid but sometimes in low concentrations), +/- 2'-O-methylphysodic acid (23%), and +/- 3-hydroxyphysodic acid (60%). Spot tests (medulla): K- or K+ slow reddish brown, KC+ orange red, usually P+ orange, sometimes P-.

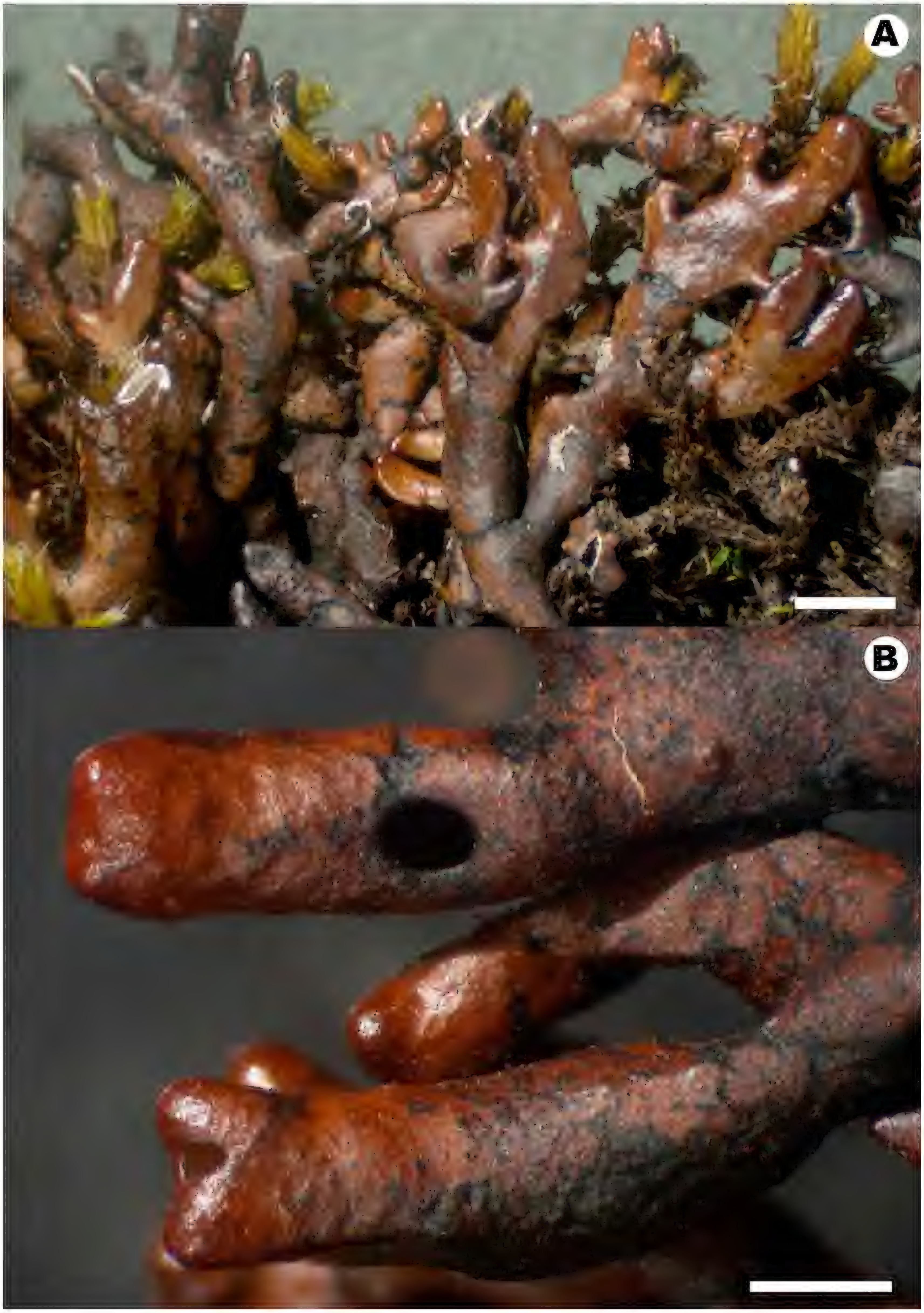

Figure 1, *Hypogymnia alpina*. A, habit (*Sharma et al. AC42*; scale = 2.0 mm). B, perforations in lobes (*Watson 23*; scale = 1.0 mm).

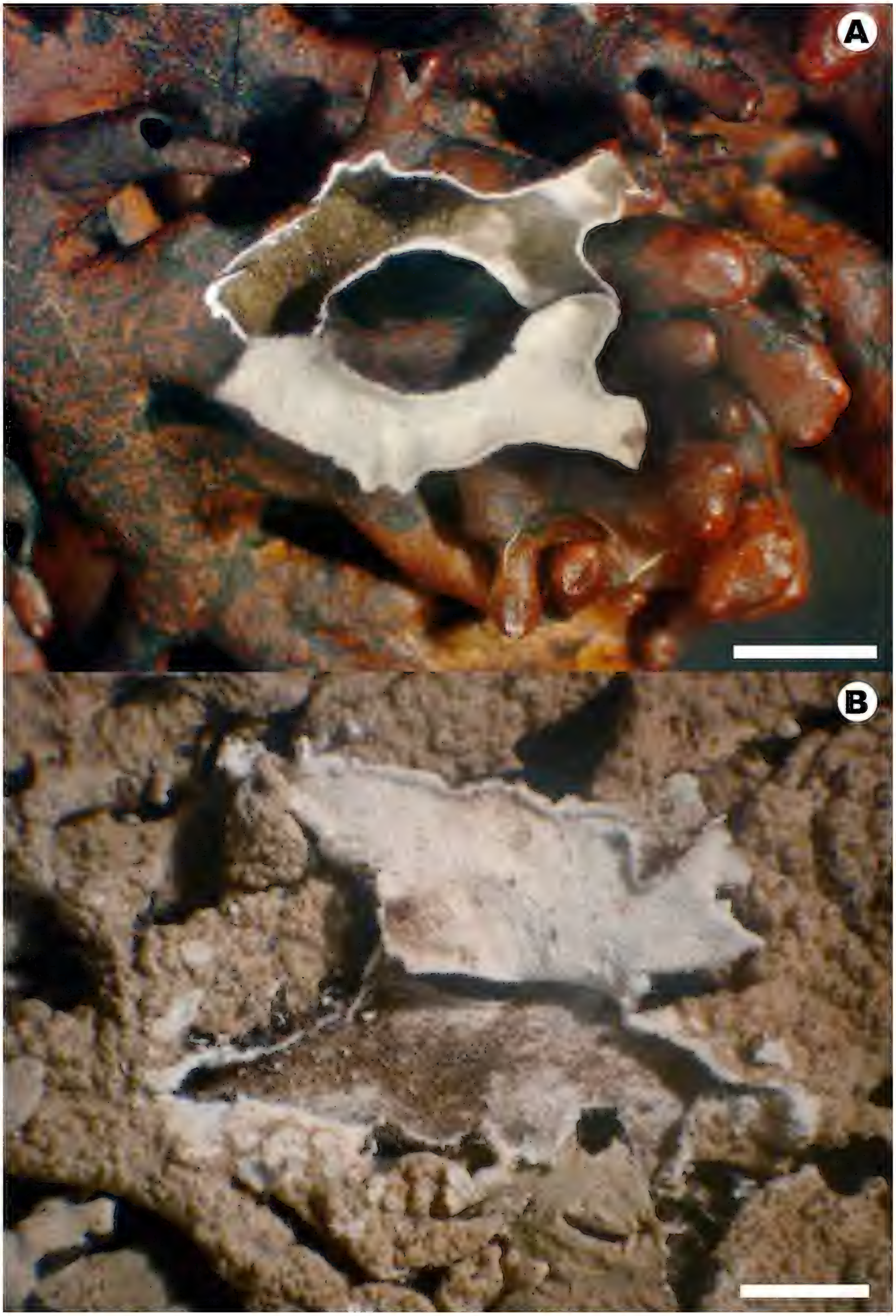

Figure 2, lobe cavities of *Hypogymnia alpina* and *H. delavayi*. A, *H. alpina* (*Watson 23*; scale = 2.0 mm). B, *H. delavayi* (holotype, *Delavay 1599*; scale = 2.0 mm).

TLC of the holotype revealed all of the substances listed above.

SUBSTRATE. – Commonly on soil and rock, also on bark and wood; subalpine and alpine.

DISTRIBUTION. – Apparently along the whole length of the Himalayas, including Bhutan, northern India, Nepal, and Tibet, and extending into the Hengduan Mountains of Sichuan and Yunnan (figure 4).

DISCUSSION. – *Hypogymnia laccata* J.C.Wei & Y.M.Jiang from southwestern China is similar in chemistry and the tendency to become dark brown. But *H. laccata* tends to form appressed rosettes rather than separate lobes, though some separate lobes are common. *H. laccata* is less strongly blackened, develops a rugose upper surface, is normally corticolous, and is less conspicuously perforate.

Selected specimens examined. – **BHUTAN. PARO DIST.:** Chele la pass, subalpine zone, 27.3667°N 89.3317°E, 3900 m, *U. Søchting 9062* (C, THIM). **CHINA. SICHUAN PROV.:** JIULONG CO.: Ji Chou Mt., 29.75°N 101.5°E, 4300 m, *L. S. Wang 96-16555b* (KUN). KANGDING CO.: Zhe Duo Mt., 30°N 102°E, 4000 m, *L. S. Wang 96-16338* (KUN); Weilong Balang Mountain, 4400 m, *Li Li-ja 5507* (CANL). YANYUAN CO.: Daling Village, Huo Lu Mt., 27.5°N 101.5°E, 4150 m, *L. S. Wang 83-1232* (KUN). **SIKANG:** KANGTING (TACHIENLU) DISTR.: Yara, 4200 m, *Harry Smith 14036* (UPS). **TIBET:** NIE LA MU CO., 28.1°N 85.9°E, 3950 m, *Chen S.-k. 26* (KUN). **YUNNAN PROVINCE:** DEQIN CO., Bei Ma Xue Shan, Ya Kou, 28.38°N 99°E, 4300 m, *L. S. Wang 94-15344* (KUN); GONG SHAN CO., Yen Niu Gu, 27.801°N 98.825°E, 2950 m, *L. S. Wang 00-19362* (KUN); LIJIANG CO., Yu-long-xue Mt., 27.033°N 100.267°E, 4100 m, *L. S. Wang 9240* (KUN); LUQUAN CO. Jiaozixue Mt., 26.100°N 102.867°E, 4200 m, *B. McCune 25560* (OSC); ZHONGDIAN CO., Daxue Mt., 28.567°N 99.817°E, 4500 m, *L. S. Wang 01-20760* (KUN); Big Snowy Mt, Da Xae Shan, summit of pass, on humus among moss on calcareous rock, 3350 m, *M. F. Watson 23* (E). **INDIA. NORTH SIKKIM:** Chubuk, above Thanngu, 4250 m, *P. K. Divakar & D. K. Upreti 04-003924* (LWG, duplicate in MAF); Yangdi, after Thanngu, 4250 m, *P. K. Divakar & D. K. Upreti 04-003952* (LWG, duplicate in MAF). **SIKKIM:** Chaunrikhiang, 4500 m, *M. F. Watson 55* (E); towards East Rathong Glacier, 4500 m, *M. F. Watson 60* (E). **UTTARANCHAL:** 16 km SE of Gangotri, Tabovan, 30.9°N 79.1°E, 4500 m, *L. Tibell 22038* (UPS). **NEPAL.** Above Yala, 28.211°85.613°E, 5120 m, *G. & S. Miehe. 4680c* (GZU); East Nepal, Sankhuwasabha Dist., SE ridge of Maklu, 27.86667°N - 87.08334°E, 5025 m, *D. G. Long 20954* (E); Himalaya: ad marginem glaciei concretae "Barun Khola superior", 27.68°N 87.26°E, 4900 m, *M. Daniel 23.V.1973* (GZU); Jikeapsa NE of Kiangjin, 28.221°N 85.676°E, 4090 m, *G. & S.Miehe 4352* (GZU); Khumbu Himal, Umgebung des Ngozumpa-Glac., Berggruppe N Chhugyuma, 27.999°86.692°E, 5400 m, *W. Brandstetter, 4.1977* (GZU); Kyangen River, 28.2239°N 85.5768°E, 4595 m, *R. Sharma et al. AC 19, AC21, AC42* (E); Kyanjan ri, 28.2205°N 85.5767°E, 4400 m, *R. Sharma, et al. L4* (E); Langsuhisa Glacier, lateral E moraine, 28.208°N 85.666°E, 4530 m, *G. & S. Miehe 12017* (GZU); Langtang area, near Kyangjin, 28.213°N 85.567°E, 3750 m, *J. Poelt N86-L258* (GZU); Niang Tscha, 28.182°N 85.625°E, 4820 m, *G. & S. Miehe 14002* (GZU); Ost-Nepal, Khumbakarna-Himal, Dhankuta Distr: Barun Glacier-Valley, 27.848°N 87.076°E, 5100 m, *T. Wraber 124-88* (GZU); Surdscha Kunda, 28.107°N 85.48°E, 4850 m, *G. & S. Miehe 8728* (GZU).

2) *Hypogymnia delavayi* (Hue) Rassad., Bot. Mater. Gerb. Bot. Inst. V. A. Komarova, 11: 5. 1956.

Parmelia delavayi Hue, Bull. Soc. Bot. France, 34: 21. 1887.[2] TYPE: **CHINA. YUNNAN PROV.:** dans la bois de Mao-kou-tchong, au dessus Tapin-tze, 2000 m, 15.v.1885, *A. Delavay 1599* (PC!).

Hypogymnia yunnanensis Y.M.Jiang & J.C.Wei, Acta Mycol. Sin. 9:293. 1990.

FIGURES 2B AND 3.

Although Elix and Jenkins (1989) selected a lectotype from a set of four related specimens collected by Delavay (PC0124209, 10, 11, and 12; the first two collected on the same day), this was unnecessary since the number on one specimen (*Delavay 1599*, PC0124210) matches that given for the holotype by Hue (1887). PC0124209 has a different number (*Delavay 1609*), while the other two were

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[2] Cited as "Hue apud Nyl., Flora 72:135. 1887" by Awasthi (1984) and Rassadina (1956). Note that the description of *P. delavayi* in Hue (1899) is much more complete than his original description (Hue 1887).

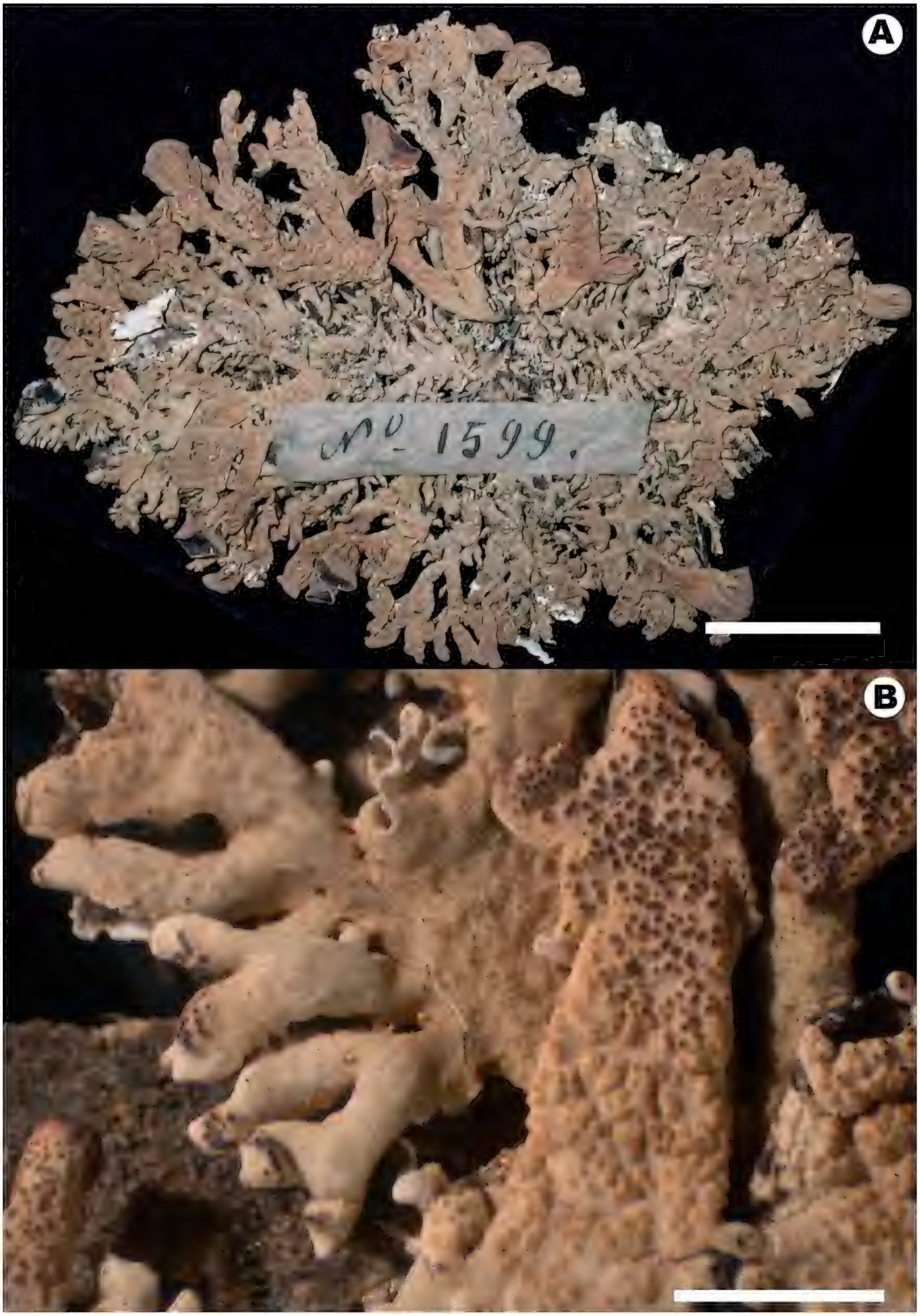

Figure 3, holotype of *Hypogymnia delavayi* (*Delavay 1599*). A, habit (scale = 2.0 cm). B, lobes showing adventitious lobules and verrucose upper surface (scale = 2.0 mm).

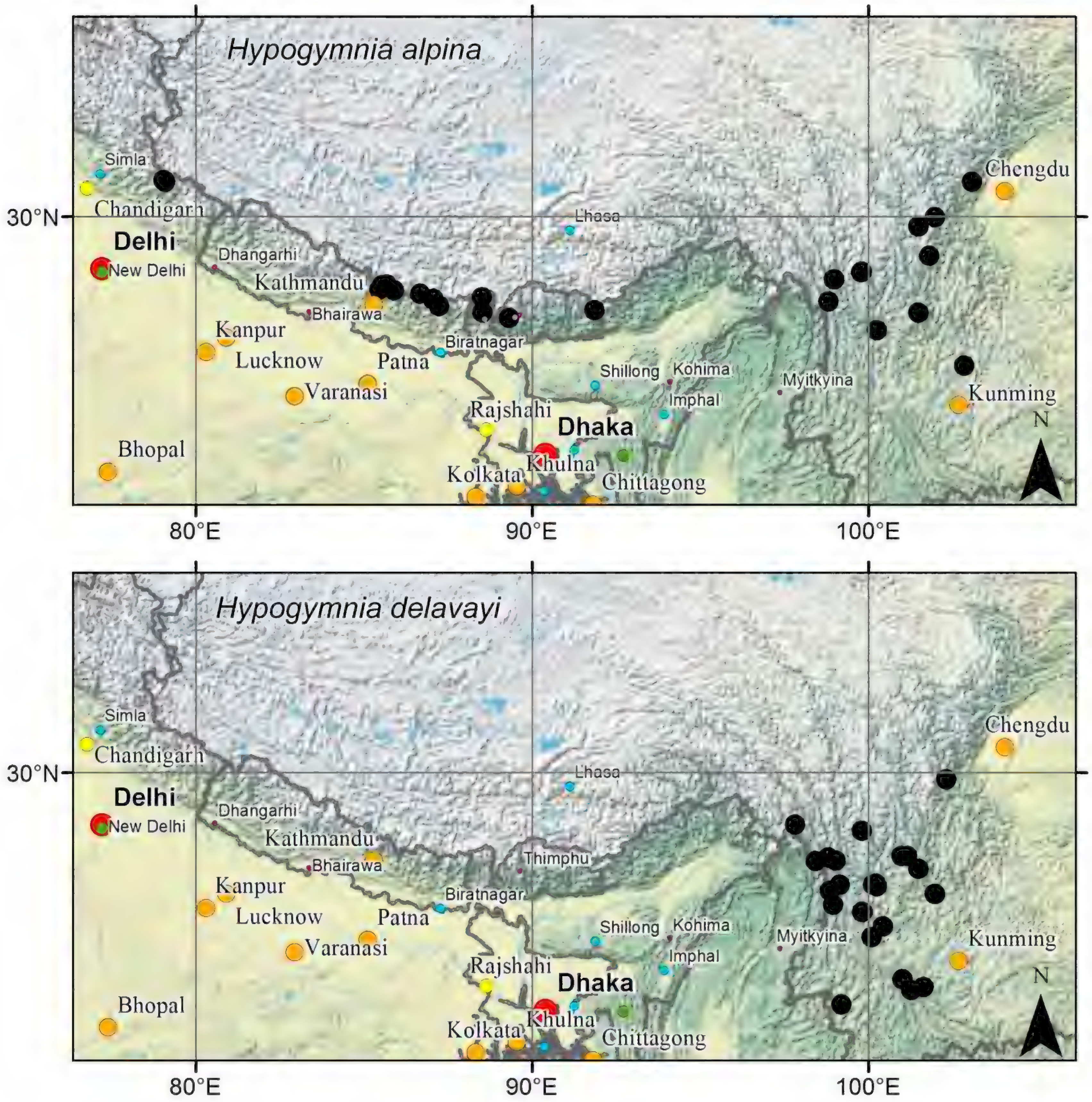

Figure 4, world distributions of *Hypogymnia alpina* (above) and *H. delavayi* (below) based on specimens examined for this study.

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apparently not numbered by Hue. In any case, all four specimens are the same species and TLC showed uniform results (atranorin, 2'-*O*-methylphysodic, physodic, 3-hydroxyphysodic, and vittatolic acids).

SYNOPSIS. – Lobes weakly to strongly pinnately branched; adventitious lobes present; upper surface slightly to extremely verrucose; cavity ceiling white, floor white to dark; lower surface often brown rather than black. This species has swollen, rather closely set lobes with abundant marginal budding of lobules, in places almost pectinate.

DESCRIPTION. – Thallus appressed, to 15 cm diam; branching variable but often somewhat pinnate; lobes commonly (0.5)1-3(10) mm broad, short and strongly inflated or elongate; lobes contiguous centrally, separate or contiguous at the margins; lateral budding and narrow perpendicular adventitious lobes often abundant, but sometimes nearly absent; upper surface becoming distinctly verrucose; lower surface near lobe tips brown to dark brown, less often black, matte or rarely glossy, usually perforate; holes in lower surface large, gaping, conspicuous, also common in lobe tips and axils, lacking a differentiated rim; ceiling of lobe cavity white; floor of lobe cavity white to brown; soredia and isidia lacking; apothecia common, sessile to substipitate, the receptacle urn- or funnel-shaped; disk reddish brown, to 8(13) mm diameter; ascospores 5.5-7.5 x 4-5 µm.

CHEMISTRY. – Atranorin, physodic, 3-hydroxyphysodic, and accessory 2'-*O*-methylphysodic and vittatolic acids; cortex K+ yellow, C-, KC-, P+ pale yellow; medulla K+ slow reddish brown, C-, KC+ orange-red, P-.

SUBSTRATE. – On bark and wood.

DISTRIBUTION. – Apparently endemic to SW China (figure 4), mainly at middle elevations (below 3200 m).

Selected specimens examined. – **CHINA. SICHUAN PROV.:** DU KOU CO.: Yan Di, Yan Kou Village, Shi Bo Mt, 27.5°N 101.5°E, 2000 m, *L. S. Wang 83-544* (KUN). LUDING CO.: Gongga Mt., Hai Luo Gou, Camp, 29.83°N 102.3°E, 3100 m, *L. S. Wang 96-16252* (KUN). MI YI CO.: Ma Long Village, Bei Puo Mt., 26.83°N 102°E, 3000 m, *L. S. Wang 83-810* (KUN). COUNTY UNKNOWN: Reg. bor.-occid., Sankar-won-ma, *Harry Smith 5246* (UPS). **SIKANG:** KANGTING (TACHIENLU) DIST.: Chungo Valley, Yara, 4050 m, *Harry Smith 14011* (UPS). **TIBET:** Cha Yu Ca, Cawarong , Song Ta Xue Mt, N slope, 28.667°N 97.833°E, 3400 m, *L. S. Wang 98-18440* (KUN). **YUNNAN PROV.:** BI JIANG CO.: Gao Li Gong Mt., 26.55°N 98.97°E, *Zang Mu 975* (KUN). BINCHUAN CO.: Ji-zhu Mt., 25.97°N 100.45°E, 3000 m, *L. S. Wang 94-15947* (KUN). DALI CO.: near trailhead to Mt. Cang Shan, 25.687°N 100.108°E, 3150 m, *B. McCune* 26765, *26766* (OSC). FU GONG CO.: Shang Pa Village, 26.917°N 98.883°E, 2100 m, *L. S. Wang 82-589* (KUN). GONG SHAN CO.: Xi Shao Fang to Qiqi, 27.7°N 98.445°E, 2600 m, *L. S. Wang 00-19275* (KUN). JIANCHUAN CO.: Shi Bao Shan Park, 75 km S of Lijiang, 26.359°N 99.840°E, 2490 m, *B. McCune 26735, 26741* (OSC). JINDONG CO.: Xu-jia-ba, Ai-lao Shan, 24.25°N 101.3°E, 2550 m, *L. S. Wang 94-14608* (KUN). LIJIANG CO.: Yu Feng Temple, 27.083°N 100.167°E, 3150 m, *L. S. Wang 93-13631* (KUN). WEI XI CO.: Ye Zhi Village, Ba Di, 27.717°N 99.05°E, 2850 m, *L. S. Wang 82-134* (KUN). YONG DE CO.: Ming Lan Village, 23.867°N 99.217°E, 2500 m, *L. S. Wang 83-2722* (KUN). ZHONGDIAN CO.: Daxue Mt., 28.503°N 99.817°E, 3400 m, *L. S. Wang 00-19904* (KUN).

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The name *Myriospora* is available for the *Acarospora smaragdula* group

LINDA IN ARCADIA[1] & KERRY KNUDSEN[2]

ABSTRACT. – The name *Myriospora* Nägeli ex Hue (1909) is not legitimate, because of its earlier validation by Uloth (1861). The name *Myriospora* Nägeli ex Uloth (1861) is here typified on *M. smaragdula* (Wahlenb. ex Ach.) Nägeli ex Uloth. The names *Silobia* M. Westb. & Wedin and *Trimmatothelopsis* Zschacke which have been used for the *Acarospora smaragdula* group, are placed in synonymy with *Myriospora* as circumscribed here. Seven new combinations are made in *Myriospora*: *M. dilatata* (M. Westb. & Wedin) K. Knudsen & L. Arcadia, *M. hassei* (Herre) K. Knudsen & L. Arcadia, *M. myochroa* (M. Westb.) K. Knudsen & L. Arcadia, *M. rhagadiza* (Nyl.) K. Knudsen & L. Arcadia, *M. scabrida* (Hedl. ex H. Magn.) K. Knudsen & L. Arcadia, *M. tangerina* (M. Westb. & Wedin) K. Knudsen & L. Arcadia, and *M. versipellis* (Nyl.) K. Knudsen & L. Arcadia. The new genus *Caeruleum* K. Knudsen & L. Arcadia is described to accommodate the species previously placed in *Myriospora*, necessitating two new combinations: *C. heppii* (Nägeli ex Körb.) K. Knudsen & L. Arcadia and *C. immersum* (Fink) K. Knudsen & L. Arcadia.

INTRODUCTION

The genus *Myriospora* Hepp, long treated as a synonym of *Acarospora* A. Massal., was resurrected by Harris (2004) to accommodate *Myriospora immersa* (Fink) R. C. Harris. Harris and Knudsen (2006) pointed out that the question of whether the name *Myriospora* was validly published by Hepp (1853) depends on whether or not fascicles 1 and 2[3] of Hepp's exsiccata *Flechten Europas* were published simultaneously. Harris and Knudsen (2006) argued that these fascicles were indeed published simultaneously. We agree with this conclusion, and with the fact that *Myriospora* was not validly published by Hepp (1853).

Recognizing that *Myriospora* was not validly published by Hepp (1853), Harris and Knudsen concluded that the name was validated by Hue (1909). Unfortunately, they overlooked a much earlier validation of the name by Uloth (1861: 617). The relevant passage reads: "Myriospora Näg. Apothecia fast krugförmig. Sporen einzellig, eiförmig oder elliptisch, in grosser Anzahl in einem Schlauch." This description, though brief, is enough for valid publication of the name *Myriospora* Nägeli ex Uloth. As a result, *Myriospora* Nägeli ex Hue is a later homonym, and not legitimate.

Uloth validly published three names at species rank in *Myriospora* as follows:

1) *Myriospora macrospora* (A. Massal. ex Bagl.) Hepp ex Uloth – Uloth introduced the name without any reference to Baglietto and as though it were a new name at the species rank for *Lecanora cervina* β *castanea* e. *scutellaris* Schaer. (1850: 55), which Uloth cited in synonymy. In other words, its type is the type of Schaerer's name. When Baglietto (1857: 396) published the name *Acarospora*

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[3] By "fascicle 1" Harris and Knudsen meant Band 1, Heft 1 -- 2, and by "fascicle 2" they meant Band 1, Heft 3 -- 4; see Sayre (1969).

macrospora he did so in a way that also typified it on *L. cervina* β *castanea* e. *scutellaris* Schaer. The name *M. macrospora* can be regarded as a combination from *A. macrospora* A. Massal. ex Bagl.

2) *Myriospora rufescens* (Ach.) Hepp ex Uloth – This name was based, via *Lecanora cervina* γ *rufescens* (Ach.) Schaer. (1850: 56) and *Lecidea rufescens* (Ach.) Borrer in Hooker & Sowerby (1831: tab. 2657), on *Sagedia rufescens* Ach. (1810: 329). This is treated today as *Acarospora rufescens* (Ach.) Zwackh (in *Flora* 45: 482. 1862, where in our view the name is validly published, though the combination is often ascribed to Bausch (1869)) or in a segregate genus as either *Silobia rufescens* (Ach.) M. Westb. & Wedin or *Trimmatothelopsis rufescens* (Ach.) Cl. Roux & Nav.-Ros.

3) *Myriospora smaragdula* (Wahlenb. ex Ach.) Nägeli ex Uloth – This name was based, via *Acarospora sinopica* var. *smaragdula* (Wahlenb. ex Ach.) Körb. (1855: 156), on *Endocarpon smaragdulum* Wahlenb. ex Ach. (1803: 29-30). (Authorship of the basionym is cited correctly under the Vienna Code: see Arcadia (2010). However, the Melbourne Code may adopt different rules; authorship may become Wahlenb.) This is treated today as *Acarospora smaragdula* (Wahlenb. ex Ach.) A. Massal. or in a segregate genus as either *Silobia smaragdula* (Wahlenb. ex Ach.) M. Westb. & Wedin or *Trimmatothelopsis smaragdula* (Wahlenb. ex Ach.) Cl. Roux & Nav.-Ros.

Uloth did not designate a type species when he validated *Myriospora*. Harris and Knudsen (2006) typified *Myriospora* Nägeli ex Hue on *M. heppii* (Nägeli ex Körb.) Hue, based on *Acarospora heppii* Nägeli ex Körb. (1859) (not "1865" as stated by Harris and Knudsen, because pages 1-96 of Körber's *Parerga Lichenologica* were published in 1859). However, that name is neither one of those included by Uloth in *Myriospora,* nor is it synonymous with any of Uloth's species. Unless we resort to conservation, which does not seem appropriate here, *Myriospora* Nägeli ex Uloth must be typified on one of the three species listed above.

The first of Uloth's species falls within the present circumscription of *Acarospora*, but the other two were recently placed in the new genus *Silobia* M. Westb. & Wedin. Thus there are two options: either typify the name *Myriospora* on *M. macrospora*, which would make *Myriospora* a synonym of *Acarospora*, at least for the present, or typify the name on *M. rufescens* or *M. smaragdula*. Because two of Uloth's three species belong to the *A. smaragdula* group, we consider the second option to be preferable and we here typify *Myriospora* on *M. smaragdula* (Wahlenb. ex Ach.) Nägeli ex Uloth, the more common of the two species.

The genus *Silobia* M. Westb. & Wedin, which was published by Westberg et al. (2011), is typified on *S. smaragdula*, the same species, so the name *Silobia* automatically becomes a synonym of *Myriospora.* Roux and Navarro-Rosinés (2011), typifying the *smaragdula* group, including *S. smaragdula*, on *Trimmatothelopsis versipellis* (Nyl.) Zschacke, made *Silobia* a synonym of *Trimmatothelopsis* Zschacke. We agree that *T. versipellis* belongs in *Myriospora* and the name *Trimmatothelopsis* is also a synonym of *Myriospora.* This resolves the debate between Westberg and Wedin (2011) and Roux and Navarro-Rosinés (2011) over the correct generic name for the *smaragdula* group. The generic concepts and the species concepts we accept here are based exclusively on Westberg and Wedin's excellent revision of the *smaragdula* group (Westberg et al. 2011). All the recognized members of the *smaragdula* group (Westberg et al. 2011, Knudsen 2011, Roux & Navarro-Rosinés 2011) are now here transferred to *Myriospora.*

The second author has studied the type of *Verrucaria versipellis* Nyl. It has a high hymenium (180-200(-220) µm in height) in elevated parathecial crowns (i.e., an expanded true exciple elevated above the thallus surface). The parathecium of the elevated crowns is 70-100+ µm thick in the sections measured. The parathecial crowns can clearly be seen in the color picture of the type published by Westberg and Wedin (2011). This high hymenium height was originally observed in the type by Roux and Navarro-Rosinés (2002), though they did not recognize the character of parathecial crowns in their analysis. The higher hymenium and elevated parathecial crowns suggest a taxon more closely related to the *Acarospora scabrida* lineages, and more specimens of *V. versipellis* might be found among Mediterranean, central European or British specimens identified as *A. scabrida.* Such specimens would have a scabrid disc which is more punctiform than the dilated discs in *A. scabrida* s. str. Because of the higher hymenium and elevated parathecial crowns, we reject *S. rhagadiza* (Nyl.) M. Westb. as a synonym of *V. versipellis* as proposed by Roux and Navarro-Rosinés (2011). We are also concerned that their revised description of *V. versipellis* in the same paper is not based solely on the type, which based on annotations they have not seen since 2002. For the same reasons (height of hymenium and presence of parathecial crowns) we reject the synonymy of the forms of *A. scyphulifera* with *V. versipellis* proposed by Roux and Navarro-Rosinés (2011) and instead accept the synonymy of these forms with *A. rhagadiza* in Westberg et al. (2011). It should be noted that without explanation, Roux (2007) separated *A. versipellis* from *A. scyphulifera* in his *Acarospora* key, which was published between Roux and Navarro-Rosinés (2002, 2011), thus agreeing with us for at least the period from 2007 to 2011.

The black scabrid discs of the type of *Verrucaria versipellis* (with some ontogenic thalline remnants persisting as an umbo on some apothecia) as well as the parathecial crowns (which, in addition to probably being naturally somewhat melanized, appear to have been melanized much further by interactions with the substrate and with cyanobacteria) gave Westberg and Wedin (2011) the impression that a lichenicolous fungus was growing on the areoles of a brown *Acarospora*. We disagree with their interpretation of this material and thus reject the synonymy of *V. versipellis* with *Polysporina subfuscescens* (Nyl.) K. Knudsen & Kocourk.

The monophyletic nature of the *smaragdula* group was well-supported in the molecular phylogenetic analyses of Wedin et al. (2009). *Myriospora heppii* is not a member of the *smaragdula* group; it differs in having a tholus staining blue in Lugol's iodine after pre-treatment with potassium hydroxide (Harris & Knudsen 2006; Knudsen 2007). Initial molecular results tentatively place it in an isolated position in the Acarosporaceae (Westberg, pers. comm., 2011). We thus erect the new genus *Caeruleum* K. Knudsen and L. Arcadia which we typify on *C. heppii*. We tentatively include one other species in the genus, *C. immersum*. This taxon needs further review that incorporates both the type and specimens from the Great Lakes area of North America. It may prove to be a synonym of *C. heppii.*

Myriospora macrospora is not a member of the *smaragdula* group, so does not belong in *Myriospora* as circumscribed here. It should continue to be treated as *Acarospora macrospora*, the name by which it has long been known.

NOMENCLATURAL AND TAXONOMIC REALIGNMENTS FOR MYRIOSPORA

I – Lecotyptification of *Myriospora* and transfer of members of the *smaragdula*-group

***Myriospora* Nägeli ex Uloth**, Flora 44: 617. 1861.

TYPE SPECIES (**selected here as the lectotype**): *Myriospora smaragdula* (Wahlenb. ex Ach.) Nägeli ex Uloth.

Syn. nov. *Silobia* M. Westb. & Wedin, Lichenologist 43(1): 10, 2011. TYPE SPECIES: *Silobia smaragdula* (Wahlenb. ex Ach.) M. Westb. & Wedin.

Syn. nov. *Trimmatothelopsis* Zschacke, Rabenh. Kryptogamen–Flora, 9, 1(1): 593. 1934. TYPE SPECIES: *Trimmatothelopsis versipellis* (Nyl.) Zschacke.

Etymology. – From Greek μϋρίος, meaning a large number of, and σπόρος, meaning a spore, referring to the many-spored asci.

Description. – Westberg et al. (2011), as *Silobia*.

1) ***Myriospora dilatata* (M. Westb. & Wedin) K. Knudsen & L. Arcadia, comb. nov.**
Mycobank #564039.

Silobia dilatata M. Westb. & Wedin, Lichenologist 43(1): 12. 2011. TYPE: **SWEDEN. TORNE LAPPMARK:** Jukkasjärvi par., Tornehamn, shore of lake Torneträsk, 3.ix.2006, on silicate rock, *E. Baloch SW116* (S[n.v.], holotype).
Trimmatothelopsis dilatata (M. Westb. & Wedin) Cl. Roux & Nav.–Ros., Bull. Soc. linn. Provence 62: 176. 2011.

2) ***Myriospora hassei* (Herre) K. Knudsen & L. Arcadia, comb. nov.**
Mycobank #564040.

Acarospora hassei Herre, Proceed. Washingt. Acad. Sci., 12: 128. 1910. TYPE: **U.S.A. CALIFORNIA.** SANTA CRUZ CO.: Santa Cruz Mountains, Castle Rock, 3000 ft., 16.vi.1906, on sandstone, *A.C.T.W. Herre 757* (FH!, lectotype [designated by Knudsen (2004)]; FH! NY!, isolectotypes).
Silobia hassei (Herre) K. Knudsen, Opuscula Philolichenum 9: 27. 2011.
Trimmatothelopsis hassei (Herre) Cl. Roux & Nav.–Ros., Bull. Soc. linn. Provence 62: 176. 2011.

3) *Myriospora myochroa* (M. Westb.) K. Knudsen & L. Arcadia, comb. nov.
Mycobank #564041.

Silobia myochroa M. Westb., Lichenologist 43(1): 14. 2011. TYPE: **SWEDEN. BOHUSLÄN:** Orust, Morlanda par., near car park at Stocken, Grid ref: (RT90) 6456258 1241653, *c.* 1 m, 16.vii. 2003, on the vertical surface of a SW-facing rock, *A. Crewe & O.W. Purvis 719* (S[n.v.], holotype).
Trimmatothelopsis myochroa (M. Westb.) Cl. Roux & Nav.–Ros., Bull. Soc. Linn. Provence 62: 176. 2011.

4) ***Myriospora rhagadiza* (Nyl.) K. Knudsen & L. Arcadia, comb. nov.**
Mycobank #564042.

Lecanora rhagadiza Nyl., Flora 64: 178, 1881. TYPE: **ENGLAND:** Barrow Mouth, Whitehaven, Cumberland, 1880, damp rocks, *W. Johnson s.n.* (H-NYL-24870[n.v.], lectotype [designated by Westberg et al. (2011)]; BM-000501100[n.v.],, isolectotype).
Acarospora rhagadiza (Nyl.) Hue, Lich. morph. et anat. 162. 1909.
Silobia rhagadiza (Nyl.) M. Westb., Lichenologist 43(1) 17. 2011.

Acarospora amphiloba f. *testacea* H. Magn., Kungl. Svenska Vetensk. Akad. Handl., sér.3, 7(4): 137. 1929. TYPE: **SWEDEN. BOHUSLÄN:** Ödsmål par., Hällesdalen, 1918, on stone by a brook, *A.H. Magnusson 2001* (UPS[n.v.], lectotype [designated by Westberg et al. (2011)]; UPS[n.v.], isolectotype).

Acarospora scyphulifera Vain. Ark. Bot. 8: 147. 1909. TYPE: **RUSSIA. CHUKOTKA:** Siberia, Peninsula Jinretlen, 1878–9, ad lapides et saxa gneissacea, parce etiam ad terram argillaceam, *E. Almquist* (TUR-VAINIO-25481[n.v.], neotype [designated by Westberg et. al. (2011)]).

Acarospora scyphulifera f. *pallescens* Vain., Ark. Bot. 8: 147. 1909. TYPE AS FOR *A. scyphulifera*; see Westberg et al. (2011).

Acarospora scyphulifera f. *impressa* Vain. Ark. Bot. 8: 148. 1909. TYPE: **RUSSIA. CHUKOTKA:** Siberia, Peninsula Jinretlen, 1878, ad lapides et saxa granitica et gneissacea locis numerosis, *E. Almquist* (TUR-VAINIO-25477[n.v.], syntype,)

Acarospora scyphulifera f. *subdiscreta* Vain., Ark. Bot., 8: 148. 1909. TYPE: **RUSSIA. CHUKOTKA:** Siberia, Peninsula Jinretlen, 1878-9, ad lapides graniticos et gneissaceos, *E. Almquist* (TUR-VAINIO-25483[n.v.], lectotype [selected by Westberg et al. (2011)]).

5) ***Myriospora rufescens* (Ach.) Hepp ex Uloth.,** Flora 44: 618, 1861.

Sagedia rufescens Ach., Lichenogr. Univ. 329. 1810. TYPE: **ANGLIA:** *Turner 23* (H-ACH-980[n.v.], lectotype [designated in Westberg et al. (2011)]).
Lecanora rufescens (Ach.) Nyl., Flora 55: 364. 1872.
Acarospora rufescens (Ach.) Kremp., Lich.–Fl. Bayern 173. 1861.
Silobia rufescens (Ach.) M. Westb. & Wedin in Westberg et al., Lichenologist 43(1): 18. 2011.
Trimmatothelopsis rufescens (Ach.) Cl. Roux & Nav.–Ros., Bull. Soc. linn. Provence 62: 176. 2011.
Acarospora fusca auct. Suec. (non B. de Lesd.?) (Westberg et al. 2011)

6) ***Myriospora scabrida* (Hedl. ex H. Magn.) K. Knudsen & L. Arcadia, comb. nov.**

Mycobank #564043.

Acarospora scabrida Hedl. ex H. Magn., Goteborgs Kgl. Vetensk. och Vitterh. Samh. Handl., ser. 4, 28(2): 55. 1924. TYPE: **NORWAY. SØR-TRØNDELAG:** Røros, På jord å vägkant, 15.vii.1895, *E. Vrang & J. P. Gustafsson s.n.* (UPS!, lectotype [selected by Knudsen (2007a)]).
Silobia scabrida (Hedl. ex H. Magn.) M. Westb., Lichenologist 43(1): 20. 2011.
Trimmatothelopsis scabrida (Hedl. ex H. Magn.) Cl. Roux & Nav.–Ros., Bull. Soc. linn. Provence 62: 176. 2011.

Acarospora verruciformis H. Magn., Goteborgs Kgl. Vetensk. och Vitterh. Samh. Handl., ser. 4, 28(2) : 58. 1924. TYPE: **NORWAY. SØR-TRØNDELAG:** Røros, 600 m, 24.vii.1919, on stone, *A. H. Magnusson 3688* (UPS[n.v.] lectotype [selected by Jørgensen & Nordin (2009)]; S [n.v.], isolectotype).

7) ***Myriospora smaragdula* (Wahlenb. ex Ach.) Nägeli ex Uloth**, Flora 44: 618, 1861.

Endocarpon smaragdulum Wahlenb. ex Ach., in Acharius, Methodus (Supplementum) 29, 1803. TYPE: **FINMARKIA NORVEGICA:** in petris insula sinus Altensis, 10.v.1802, *G. Wahlenberg s.n.* (UPS-L-137960[n.v.], lectotype [selected by Westberg et al. (2011)]).
Acarospora smaragdula (Wahlenb. ex Ach.) A. Massal., Ric. auton. lich. crost. 29. 1852.
Silobia smaragdula (Wahlenb. ex Ach.) M. Westb. & Wedin**,** Lichenologist 43(1): 21. 2011.
Trimmatothelopsis smaragdula (Wahlenb. ex Ach.) Cl. Roux & Nav.–Ros., Bull. Soc. linn. Provence: 62: 176. 2011.

Acarospora alberti Samp., Liquenes inedito 5. 1920. TYPE: **PORTUGAL. MINHO:** Ponte de Lima, Sá, nas paredes (muito rara), 28.ix.1920, *G. Sampaio s.n.* (PO[n.v.], lectotype, designation unknown).

Acarospora amphibola Wedd., Mem. Soc. nation. Sci. nat. Cherbourg 19: 279. 1875. TYPE: **FRANCE. VENDEE:** Ile d'Yeu, rochers à fleur de terre de la Pointe des Corbeaux, 28.v.1875, *H.A. Weddell s.n.* (PC-0113610[n.v.], lectotype [selected by Westberg et al. (2011)]).

Acarospora isotorqensis Alstrup, Nordic. J. Bot., 1: 120. 1981. TYPE: **GREENLAND. SØNDRE ISORTOQ:** Ivnarssuaq, 1977, on N-facing vertical rock, *V. Alstrup 77899*(C[n.v.], holotype).

Acarospora lesdainii A.L. Sm., Monograph British Lichens 1: 334. 1918. TYPE: **ENGLAND:** near Keighley, Harden Moor, road to Ryecroft from guide post at *c.* 1000 ft., [undated], *T. Hebden s.n.* (BM-000501103[n.v.], lectotype [selected by Westberg et al. (2011)]).
Acarospora smaragdula var. *lesdainii* (A.L. Sm.) H. Magn., Kungl. Svenska Vetensk–Akad. Handl., ser. 3, **7**(4): 144. 1929.

Acarospora murina Sandst. Abhandl. Heraus. Naturw. Ver. 21: 141. 1912. TYPE: **GERMANY. OLDENBURG**: Edewecht, an Dachziegeln, 1891, *H. Sandstede s.n.* (HBG[n.v.] lectotype [selected by Westberg et al. (2011)]).

Acarospora undata Clauzade, Cl. Roux & V. Wirth, Bull. Mus. Hist. nat. Marseille 41: 39. 1982. TYPE: **GERMANY. BADEN:** Südschwarzwald, Präg (Kr. Lörrach), auf abgesprengten Felsen an der Strasse kurz oberhalb des Ortes, 4.ix.1971, *V. Wirth s.n.* (STU-Wirth[n.v.], holotype).

8) ***Myriospora tangerina* (M. Westb. & Wedin) K. Knudsen & L. Arcadia, comb. nov.**
Mycobank #564044.

Silobia tangerina M. Westb. & Wedin, Lichenologist 43(1): 22. 2011. TYPE: **SWEDEN. HÄRJEDALEN:** Tännäs par., [Ljusnedal par.,] Mt Gruvvålen, just N of Glimsjön (*c.* 2 km NE of Ramundbergets fjällgård), alt. 920 m, an old coppermine, 17.viii.1983, on asbestos, *R. Santesson 30943* (UPS[n.v.], holotype).

Trimmatothelopsis tangerina (M. Westb. & Wedin) Cl. Roux & Nav.–Ros., Bull. Soc. linn. Provence: 62: 177. 2011.

Acarospora lesdainii var. *subochracea* H. Magn. Rep. Scient. Res. Norw. Exp. N. Zemlya 1921, 34**:** 5. 1926. TYPE: **RUSSIA. NOVAYA ZEMLYA:** Mashigin Fjord, outside Nausenfjell, 10.x.1921, *B. Lynge s.n.* (O[n.v.] lectotype [selected in Westberg et al. (2011)]).

9) ***Myriospora versipellis* (Nyl.) K. Knudsen & L. Arcadia,** comb nov.
Mycobank #564045.

Verrucaria versipellis Nyl., Flora 60: 230. 1877. TYPE: **GALLIA OCCIDENTALIS:** Maine et Loire, La Renaudière, supra tegulas lateritias vetustas, 1876, *Brin s.n.* (H-NYL 24518!, holotype).
Trimmatothele versipellis (Nyl.) Zahlbr., in Engler & Prantl, Natür. Pflanzenfam. 1(1): 56. 1903.
Trimmatothelopsis versipellis (Nyl.) Zschacke, Rabenh. Kryptogamen– Flora 9, 1(1): 593. 1934.
Endocarpon versipellis (Nyl.) H. Olivier, Lichens de l'ouest et du nord–ouest de la France 2: 237. 1902.
Endopyrenium versipellis (Nyl.) Boistel, Nouvelle flore des lichens 2: 264 & 267. 1903.
Acarospora versipellis (Nyl.) Cl. Roux & Nav.–Ros., Bull. Soc. linn. Provence 53: 152. 2002.

II – Description of *Caeruleum* and transfer of species previously placed in *Myriospora*

***Caeruleum* K. Knudsen & L. Arcadia, gen. nov.**
Mycobank #564046.

TYPE SPECIES: *Caeruleum heppii* (Nägeli ex Körb.) K. Knudsen & L. Arcadia

Diagnosis. – Similar to *Acarospora* but differing in the blue stain of the tholus in Lugol's iodine after pretreatment in potassium hydroxide (K).

Etymology. – From Latin *caeruleum*, a blue colour, referring to the blue tholus stain.

1) ***Caeruleum heppii* (Nägeli ex Körb.) K. Knudsen & L. Arcadia, comb. nov.**
Mycobank #564047.

Acarospora heppii Nägeli ex Körb., Parerga Lich. 61. 1859. TYPE: "Auf Kalkstein – Findlingen" *Hepp s.n. = Flecht. Eur. 57* (NY!, lectotype [designated by Harris and Knudsen (2005)]; NY!, isolectotype).
Myriospora heppii Nägeli ex Hepp, Systematische Sammlung der von Dr. Hepp im Kanton Zürich Tab. 13, no.148. n.d. *nom. nud.*, Flecht. Eur. fasc. 2, no. 57. 1853 *nom. inval.* (Art. 43).
Myriospora heppii (Nägeli ex Körb.) Hue, Nouv. Arch. Mus. Hist. Nat. Paris 1: 164. 1909.

Acarospora aeruginosa Hasse, Contrib. U.S. Nat. Herb. 17(1): 68. 1913. TYPE: **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, *H.E. Hasse s.n.* (FH!, holotype)

Note. - For a description of this species see Knudsen (2007b).

2). ***Caeruleum immersum* (Fink) K. Knudsen & L. Arcadia, comb. nov.**
Mycobank #564048.

Acarospora immersa Fink *in* Hedrick, Mycologia 26: 158. 1934. TYPE: **U.S.A. OHIO:** Oxford, 15.v.1927, on limestone, *B. Fink s.n.* (MSU[n.v.], holotype).
Myriospora immersa (Fink) R.C. Harris, Opuscula Philolichenum 1: 70. 2004.

Note. – Hedrick (1933) clearly states that the descriptions she was publishing were written by Bruce Fink thus the sole authority is used here.

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Canoparmelia cinerascens belongs in the genus *Parmelinella* (Parmeliaceae, lichenized Ascomycota)

MICHEL NAVARRO BENATTI[1]

ABSTRACT. – *Canoparmelia cinerascens*, a species previously included in the genus *Canoparmelia* is actually a member of the genus *Parmelinella*. As such, the new combination *Parmelinella cinerascens* (Lynge) Benatti & Marcelli is proposed here. The species is described in detail and an epitype is selected to aid interpretation due the poor condition of the holotype.

KEYWORDS. – Axillary cilia, *Parmelinella wallichiana*, salazinic acid

INTRODUCTION

Canoparmelia Elix & Hale, a segregate of the eciliate parmelioid lichen genus *Pseudoparmelia* Lynge (Hale 1976), is characterized by the typically gray or rarely yellow-green thalli containing cortical atranorin and chloroatranorin (or rarely usnic acid), the 3.0−5.0 mm rotund or subrotund eciliate lobes, the white medulla, the black lower surface with naked brown margins and simple concolorous rhizines, small ellipsoid ascospores 10−14 × 6−8 µm, and fusiform or bifusiform conidia 7−10 µm in length (Elix 1993, Elix et al. 1986).

When the genus *Parmelinella* was segregated from *Parmelina* Hale, only three species originally in *Parmelina* had been recombined into *Parmelinella* (Elix & Hale 1987). However, the species with small axillary cilia discussed in this paper was misplaced in *Pseudoparmelia* sensu Hale, and later automatically transferred to *Canoparmelia*.

Working with small Parmeliaceae species from the Southeastern Region in Brazil, the author noted that the isidiate and salazinic acid containing species *Canoparmelia cinerascens* did not fit well with the concept of the genus proposed by Elix et al. (1986). By analyzing the morphological and chemical characters of the species, including analysis of the type collection, we have concluded that due to their ascospore and conidia dimensions, the constant presence of small axillary cilia and the medullary chemistry place the species in the current concept of the genus *Parmelinella* Elix & Hale (1987).

Parmelinella was segregated from the genus *Parmelina* Hale by Elix and Hale (1987). It was characterized by these authors by the following combination of characters: broad rotund lobes, emaculate thallus, sparse simple cilia mostly restricted to the axils, simple black rhizines, ellipsoid spores, short cylindrical conidia, and medullary salazinic and consalazinic acids. However, the concept of this genus, like many others segregated in this family, has changed in some characteristics since its publication.

Subsequent authors have broadened this concept to one consisting of the following characters: the grey to yellowish or greenish gray thalli containing atranorin (with some species containing variable amounts of chloroatranorin and secalonic A acid), 1−12 mm rotund to subrotund lobes with mainly short axillary simple cilia, the absence of maculae and pseudocyphellae, white to sometimes partially yellowish medulla, a black to brown lower surface, with brown, naked or papillate margins, usually simple rhizines, globose to ellipsoidal ascospores 4−28 × 4−16 µm, and bacilliform to short filiform or weakly bifusiform cylindrical conidia 5−9 µm in length (Divakar & Upreti 2005, Elix 1994, Elix & Hale 1987, Eliasaro & Adler 2000, Hale 1976, Kurokawa & Lai 2001, Louwhoff & Elix 2002, Marcelli 1993, Marcelli & Ribeiro 2002, Pooprang et al. 1999, Swinscow & Krog 1988).

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MATERIALS AND METHODS

The morphological and anatomical characters of the specimens were analyzed using standard stereoscopic and compound microscopes. Anatomical sections, including those of apothecia and pycnidia when present, were made with a razor blade by hand. The chemical constituents were checked by spot tests with potassium hydroxide (K), sodium hypochlorite (C) and para-phenylenediamine (P), and also examined under UV light (360 nm). Chemical constituents of the additional specimens examined were identified by thin-layer chromatography (TLC) using solvent C (Bungartz 2001), and compared with the data on labels left with the specimens.

TAXONOMIC SECTION

***Parmelinella cinerascens* (Lynge) Benatti & Marcelli, comb. nov.**
Mycobank #563647.

FIGURE 1.

Parmelia cinerascens Lynge, Arkiv för Botanik 13: 104. 1914. TYPE: **PARAGUAY:** Paraguari, 2.viii.1893, ad arborem sat solitariam, in ripa rivuli campi, *G.O. Malme 1498* (S!, holotype). EPITYPE: **BRAZIL. SÃO PAULO:** Ubatuba Municipality, Parque Estadual da Serra do Mar, Núcleo Picinguaba, restinga woods facing the sea, 1 m, 23°21'41.1"S 44°50'53"W, 13.i.2007, *A.A. Spielmann 3155* (SP!, epitype [**designated here**]; S!, isoepitype).

Pseudoparmelia cinerascens (Lynge) Hale, Phytologia 29:189. 1974.

Canoparmelia cinerascens (Lynge) Elix & Hale, Mycotaxon 27: 278. 1986.

Description. – Thallus lobed, pale gray to greenish gray becoming dusky gray in herbarium, up to 11.0 cm diam., submembranaceous, corticolous. Lobes irregularly ramified to subdichotomous, 1.0–3.5 mm wide, contiguous to imbricate, closely adnate and adpressed, with rotund or subrotund apices, the margins entire to partly subcrenate, ±plane, upper surface continuous, smooth in the distal parts, sometimes slightly rugose in the older parts. Maculae weak to absent, punctiform, laminal. Cilia restricted mainly to the lobes axils, scarce, simple and very short (< 0.5 mm length). Lacinulae absent, small adventitious lobules absent to ±common, usually in the older parts. Soredia and pustulae absent. Isidia granular to short cylindrical, 0.05−0.30 × ca. 0.05 mm, smooth, simple, erect, firm to caducous, concolor with brown or black apices, eciliate, laminal. Medulla white, without K+ pigments. Lower surface black, sometimes mottled with dark brown spots, shiny, slightly rugose, sometimes slightly veined or papillate. Marginal zone pale to dark brown, shiny, 1.0–3.0 mm wide, attenuate, slightly rugose or veined, usually naked but sometimes sparsely papillate or rhizinate approaching the center. Rhizines dark brown to black, pale brown near the margins, simple and acute, 0.10−0.50 (−0.70) × ca. 0.05 mm, frequent, ±evenly distributed but partially crowded at some parts. Apothecia concave, sessile, imperforate, eventually isidiate, ascospores ellipsoid, (6,0−) 8,0−12,0 × 4,0−6,0 µm, epispore ca. 1,0 µm. Pycnidia scarce, submarginal, with black ostioles. Conidia baciliform to ± weakly bifusiform, 5.0−9.0 × ca. 1,0 µm.

Chemistry. – TLC/HPLC: cortical atranorin and chloroatranorin; medullary salazinic acid, and consalazinic acid, with traces of protocetraric acid and of an unknown substance (agreeing with a label of J. Johnston with the holotype, 31-VII-1985; the protocetraric acid and the unknown substance might be contaminants). Spot tests: cortex K+ yellow, UV−; medulla K+ yellow turning dark red, C−, KC−, P+ yellow, UV−.

Discussion. – *Parmelinella cinerascens* was reported for Brazil (Hale 1976, Marcelli 2004) from the States of Minas Gerais, Pernambuco and São Paulo (Hale 1976, Ribeiro 1998, Jungbluth 2006), Paraguay (Lynge 1914), Uruguay and Venezuela (Feuerer 2005). Outside of South America it has been reported only from India (Divakar & Upreti 2005).

The type specimen is completely reduced to small fragments, leaving it almost useless for taxonomic study. Due this and the absence of any other specimen left by Lynge at S, we decided to nominate an epitype that clearly showed concordant characteristics, also from South America and similar latitude (as is most of the addition material examined here).

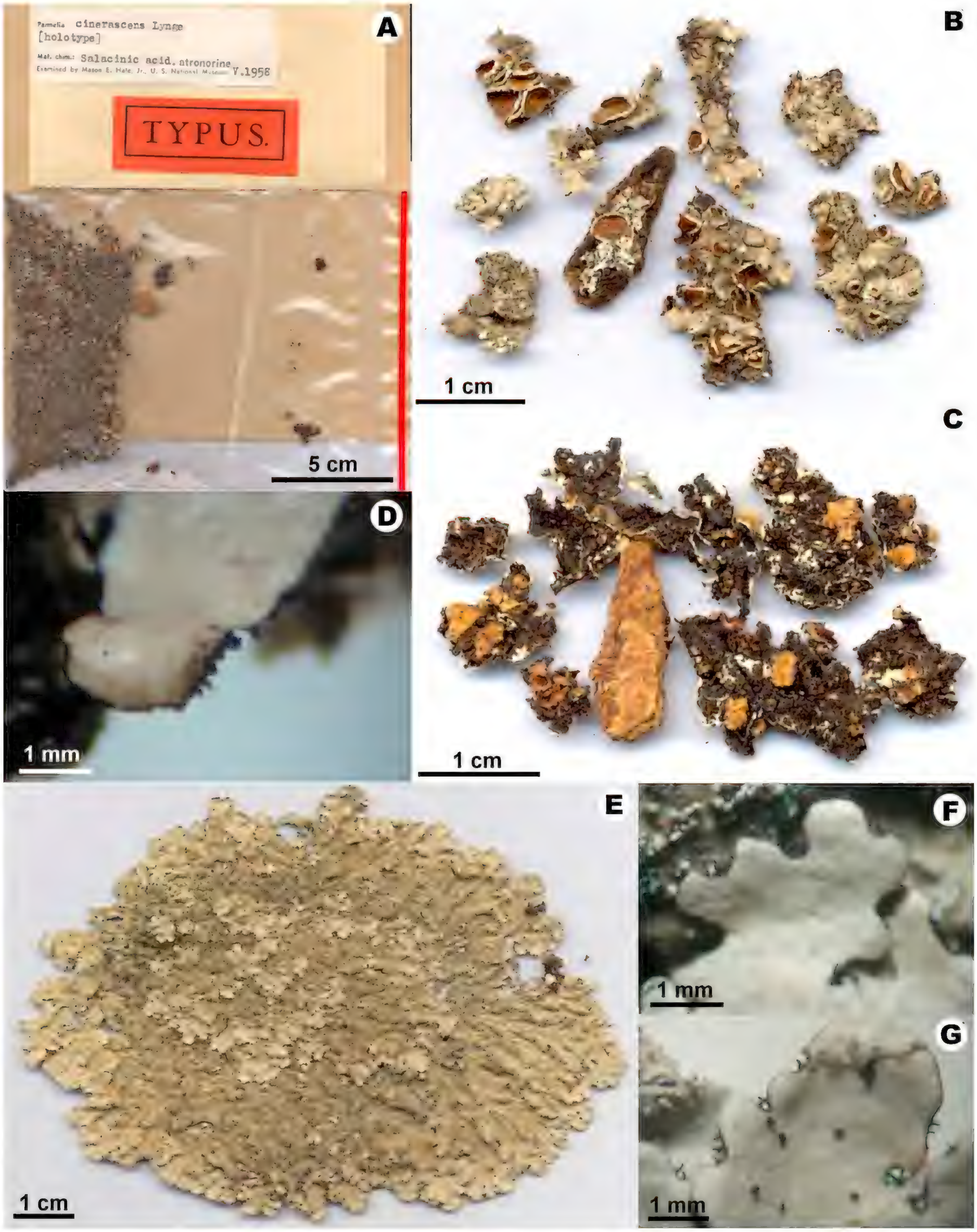
A
Parmelia cinerascens Lynge
[holotype]
Mat. chem.: Salacinic acid. atronorine
Examined by Mason E. Hale, Jr., U. S. National Museum V.1958
TYPUS.
5 cm
B
1 cm
C
1 cm
D
1 mm
E
1 cm
F
1 mm
G
1 mm

Figure 1. Holotype and epitype of *Parmelinella cinerascens*. **A**, the very damaged, almost pulverized type collection. **B**, detail of the largest fragments found, on stereomicroscope. **C**, the same fragments seen from lower side. **D**, the tiny simple marginal cilia on a fragment of the holotype. **E**, the full specimen selected as epitype, before being cut in half; the right half is at SP, while the left half is at S. **F and G**, details of the tiny marginal cilia on the epitype; the first on an old lobe and the second on a young lobe.

We also confirmed that the ascospores seen in some scattered apothecia on the fragments of the holotype of *Parmelinella cinerascens* were in accordance to those mentioned by Hale (1976), and not the larger ascospores originally described by Lynge (1914).

Although difficult to observe due the poor condition of the type and their scarcity and very small size, axillary cilia were found on some of the fragments (figure 1D). This confirms one of the typical characteristics of species of *Parmelinella* (Elix & Hale 1987, Elix 1993, Divakar & Upreti 2005, Benatti & Marcelli 2007). These small cilia were found on all specimens examined, with similar dimensions and distribution patterns (usually < 0.5 mm long, and near always axillary). Due their position and size, it is not surprising that these structures were easily overlooked or misinterpreted.

Parmelinella wallichiana (FH-Tayl!, holotype), is also isidiate, has axillary cilia and a dark lower cortex. It is found in Asia, Africa and Australia, with a few references to Brazil (Eliasaro & Adler 2000, Eliasaro 2001, Canêz 2005, Jungbluth 2006). Due to morphological and chemical similarities, the two species might occasionally be confused with one another. The few works that report *P. wallichiana* from South America (Hale 1976, Ribeiro 1998, Jungbluth 2006) did not mention *P. cinerascens*, which might be the correct name for the relevant vouchers since their descriptions differ from the type specimen of *P. wallichiana*.

As confirmed by examination of the type collection, *Parmelinella wallichiana* is a much larger lichen than *P. cinerascens*, and the lobes are usually (2.0–) 3.0–10.0 (–15.0) cm wide. It also has larger ascospores 15.0–20.0 × (8.0–) 10.0–12.5 µm, and a uniformly brown lower cortex, bearing darker rhizines. The cilia on *P. wallichiana* are more frequent on the margins, in addition to being concentrated at the lobe axils.

Given the differences between these species we question whether there are any reports of authentic *Parmelinella wallichiana* from South America. Based on the published descriptions of South American '*P. wallichiana*' this may well be a form of the more common *P. cinerascens*, or even an undescribed species morphologically close to it. The specimens cited have ±reticular maculae as well as identical lobe width and shape, scarce axillary short cilia and usually a brown lower cortex (thalli of *P. cinerascens* can have a black or mottled black and brown lower cortex).

As was noted by Jungbluth (2006), there are also differences outlined by Divakar and Upreti (2005) between specimens with very different sized ascospores from different regions of India, those of Sikkim have apparently identical ascospores (15.0–20.0 × 9.0–14.0 µm) to those of the holotype of *Parmelinella wallichiana*, while others from Southern India have much smaller ascospores (8.0–10.0 × 4.0–5.0 µm) closer to those seen in *P. cinerascens*. Further study of Indian material is needed to determine the status of those populations.

Additional specimens examined. – **BRAZIL. SÃO PAULO:** Municipality of Itirapina, João Batista de Arruda Penitentiary, cerrado vegetation, 16.viii.2003, on a tree trunk, *P. Jungbluth & F.R. Martins 511* (SP), on thick cork tree, *P. Jungbluth & F.R. Martins 543b* (SP), *P. Jungbluth & F.R. Martins 550* (SP); Municipality of São Paulo, Parque Estadual da Cantareira, on roadside to Mairiporã, 25.vi.1991, on tree trunk, *M.P. Marcelli et al. 11584* (SP). **MINAS GERAIS:** Municipality of Catas Altas, Serra do Caraça, Parque Natural do Caraça, next to the gate of the courtyard in front of the hotel, 9.ix.1997, on stone wall, *M.P. Marcelli & C.H. Riberio 31955* (SP).

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Some Notes on Acarosporaceae in South America

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ABSTRACT. – Three species and one genus are reported new for South America (all are from Ecuador): *Acarospora americana, Caeruleum heppii,* and *Polysporina simplex*. *Acarospora catamarcae* and *A. thelomma* are verified as distinct species occurring in Argentina. *Acarospora punae* is placed in synonymy with *A. thelomma* and lectotypes are designated for both names. *Acarospora sparsiuscula* is also verified as a distinct species, originally described from Argentina and here reported from the Galapagos Islands in Ecuador. A total of twenty-seven species of Acarosporaceae are recognized as occurring in South America in this ongoing taxonomic series.

KEYWORDS. – Biodiversity, taxonomy.

INTRODUCTION

This paper is a new installment of a continuing series of studies Acarosporaceae in South America (Knudsen 2007a; Knudsen & Flakus 2009; Knudsen et al. 2008, 2010, 2011, in press.). In this paper I examine two species described by Magnusson (1947) from South America, *Acarospora catamarcae* H. Magn. and *A. sparsiuscula* H. Magn., and two species described by Lamb (1947) from South America, *A. thelomma* I.M. Lamb and *A. punae* I.M. Lamb. During the period of this study I also examined specimens collected by Zdenek Palice in Ecuador (PRA) and by Andre Aptroot on the Galápagos Islands in Ecuador (CDS) as well as specimens from Graz (GZU). A current checklist with literature references is also included. Species are only included in the checklist if they have been verified by myself as part of this continuing study.

Taxonomy is experimental. A species concept generated by the study of specimens is a hypothesis. Once a species is named, then it can be further tested by identifying new collections, and revised with further taxonomic studies as well as with molecular, biogeographical, and populational studies. In this series of taxonomic studies, most of the species concepts are represented by a small sample of specimens. In the future, I expect changes in these species concepts and accepted nomenclature.. The main aim of this series is to stimulate more extensive collections and field observations of Acarosporaceae in South America, as well as studies by teams using a variety of tools, including molecular phylogenetic analysis.

MATERIALS AND METHODS

Specimens were studied from CDS, GZU, PRA, UCR, and UPS. Specimens were prepared with hand sections and studied using standard light microscopy, unless otherwise stated in text. Measurements were made in water. Amyloid reactions tested with Lugol's Solution (IKI), with or without pretreatment with KOH (K), and the structures were studied in 5% K. Standard spot tests were performed but no thin-layer chromatography was performed.

NOTES

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1) *Acarospora americana* H. Magn., Kungl.-Akad. Handlingar 7(4): 198. 1929. TYPE: **U.S.A. ILLINOIS**. KANE CO.: sine loc., 1895, on silicate rock, *B. Fink s.n.* (UPS!, holotype; MIN! NY! isotypes).

Notes. – For a description and illustrations of this species see Knudsen et al. (2011). The species has a brown areolate to squamulose thallus and is widespread in North America and has a wide ecological amplitude and corresponding wide range of morphological variation. The two specimens cited below are pruinose, dark brown, and resemble specimens of the *caesioalba-superfusa* morphotype. The species is here newly reported for South America from Ecuador.

Specimens examined. – **ECUADOR. GALÁPAGOS PROV.:** WESTERN/OESTE: Isabela, Volcán Alcedo, on crater rim NW of hut at highest point, humid zone, tortoise pasture with bare soil and scattered trees (*Tournefortia rufo-sericea*, *Zanthoxylum fagara*), 0°25'51"S 91°5'16"W, 1190 m, 5.iii.2006, on lava rock, *A. Aptroot 64834* (CDS 31409). **IMBABURA PROV.:** Laguna Cuicocha, east edge, ca. 9 km W of town Cotacachi, 0°17'37"S 78°21'04"E, 3200-3500 m, 8.x.2000, on volcanic stones along a trail, *Z. Palice 4473* (PRA).

2) *Acarospora catamarcae* H. Magn., Acta Horti Gothob. 17: 64. 1947. TYPE: **ARGENTINA. CATAMARCA PROV.:** ANDALGALÁ DEPT.: Cuesta de las Chileas, 21.ix.1945, on siliceous rock, *M. Digilio-Crassi 2846* (UPS!, holotype)

Notes. – For a description of this species see Magnusson (1947). This yellow species was described from Argentina and is only known from the holotype. It is a disappointing type specimen with a small amount of the taxon growing next to *Acarospora boliviana* H. Magn. Rather than dissecting the specimen, I had to rely on a stereo microscope examination coupled with a critical reading of the original description. In the future an epitype needs to be designated when a better specimen is found.

The slightly glossy areoles and reddish brown to yellow apothecial discs of *Acarospora catamarcae* resemble *A. rhabarbarina,* which is common in Argentina (Knudsen 2007a; Knudsen et al. 2008). The specimen is small, the areoles possibly reduced by environmental stress, with fertile areoles approximately 0.5 mm in diameter, while the largest areoles are sterile and approximately 1 mm in diameter.

I compared *Acarospora catamarcae* with *A. rhabarbarina*. The type of *A. catamarcae* differs significantly from *A. rhabarbarina* in having a much wider parathecium (80 µm vs. 10-30 µm). I have not observed this to be a variable character in *A. rhabarbarina* and neither did Magnusson (1929). Based on this difference, I tentatively accept *A. catamarcae* as a taxon distinct from *A. rhabarbarina*, however more specimens are needed for a detailed revision.

Two other characters, hymenial height and width of cortex, differ from *Acarospora rhabarbarina,* but are not definitive in and of themselves due to the small size of the type. The hymenium of *A. catamarcae* is on the low end of the range of specimens of *A. rhabarbarina* I have observed so far (75-85 µm vs. 90-110 µm). Magnusson (1929) reported heights of 80-100 µm from his specimens (under the synonym *A. bella* (Nyl.) H. Magn.). However the differences between his observations and my own are not a significant. The width of the cortex in *A. catamarcae* is also below the lower limit of *A. rhabarbarina*, which varies in my measurements of specimens so far examined (35-40 µm vs. 50-130 µm). Magnusson (1929) also reported a wide range of cortical widths in *A. rhabarbarina* (50-120 µm). In large, well-developed areoles of *A. rhabarbarina* the eucortex can become very thick (50-130 µm). This wide range of cortical widths has also been observed in *A. strigata* (Nyl.) Jatta (Knudsen 2007a). In some species, such as *A. rhabarbarina* and *A. strigata*, as thalli grow larger new layers of hyphae are added to the cortex as well as the medulla and there is also usually a corresponding increase in the width of the algal layer. In other species of *Acarospora* increased size may only result in thickening of the algal layer and/or the medulla. More specimens of *A. catamarcae* are needed to determine if it always has a thinner cortex than *A. rhabarbarina*.

Magnusson (1947) compared *Acarospora catamarcae* to *A. regnelliana* R. Sant., a species whose type I have not yet been able to examine. It may prove to be an earlier name for *A. catamarcae*. Magnusson (1947) also stated that *A. catamarcae* resembled a number of African species, none of which he to cited. This may indicate that an earlier name also exists amongst the species with African type specimens.

3) ***Acarospora rhabarbarina*** **Hue**, Morph. et Anat. 117. 1909. TYPE: **CHILE**: Quilmenco, *C. Gay s.n.* (PC[sheet 1]!, lectotype [designated by Knudsen et. al. (2008)]).

Notes. – For descriptions and illustrations of this species see Knudsen (2007a) and Knudsen et. al. (2008). The yellow species has been reported from Argentina, Bolivia, Chile, and Peru (Knudsen 2007a, Knudsen et al. 2008). It is here reported new for Venezuela based on a collection by the Oberwinklers and Poelt.

Specimen examined. – **VENEZUELA. MERIDA:** sine loc, 900 m, iii.1969. *B. Oberwinkler et al. s.n.* (GZU).

4) ***Acarospora sparsiuscula*** **H. Magn.**, Acta Horti Gothob. 17: 65. 1947. TYPE: **ARGENTINA. MENDOZA PROV.:** SAN RAFAEL DEPT.: San Rafael, 2.ii.1946. *L. Rossi 6797* (UPS!, holotype)

Notes. – Those who do not study types would be surprised at the poor quality of some type specimens. The type of *Acarospora sparsiuscula* is exceptionally sparse, only two tiny areoles which are probably sterile. As with *A. catamarcae* above, I had to rely on a stereo microscope examination coupled with a critical reading of the original description.

For a full description see Magnusson (1947). The specimens I examined were comprised of scattered brown areoles or squamules, without a dark underside, with an even algal layer, a hymenium about 100 µm tall, and a KC+ reddish cortex indicating the presence of gyrophoric/lecanoric acid. There are only three other species with gyrophoric/lecanoric acid currently known from South America, all known from one or a few collections. *Acarospora obpallens* (Nyl. ex Hasse) Zahlbr. differs in forming small round areoles or verrucae with small pits surrounding the apothecia. *Acarospora subcastanae* (Nyl.) Hue (syn. *A. mendozana* H. Magn. and *A. sanguinascens* Zahlbr.) has an areolate to squamulose continuous thallus that is subeffigurate and sometimes has a very weak KC+ reaction (this led Magnusson (1929) to describe *A. mendozana* as C-). *Acarospora oligyrophorica* Aptroot, the type specimen of which I have not yet examined, differs in having large ascospores like *A. macrospora* A. Massal. ex Bagl.

Magnusson (1947) compared *Acarospora sparsiuscula* to *A. sparsa* H. Magn. which was described from North America. This comparison is not helpful however. The type of that species is lost (Knudsen et al. 2011). Magnusson (1947) also compared *A. sparsiuscula* to *A. interspersa* H. Magn., which is a synonym of *A. succedens* H. Magn., and as he stated is a very different species with an interrupted algal layer (Knudsen 2009, Knudsen 2011).

I here report *Acarospora sparsiuscula* new to Ecuador from the Galapágos Islands from a small collection that matches the description but is better developed than the type. More specimens are needed for a detailed revision.

Specimen examined. – **ECUADOR. GALÁPAGOS PROV.:** WESTERN/OESTE: Isabela, Volcán Alcedo, in the crater near fumaroles, 0°27'9"S 91°7'33"W, 780m, 7.iii.2006, on sulphur induced rocks, *A. Aptroot 64806* (CDS 31381).

5) ***Acarospora thelomma*** **I.M. Lamb**, Lilloa 14: 233. 1948. **ARGENTINA. MENDOZA PROV.:** SAN RAFAEL DEPT.: San Rafael, Cienaguita, Rio Salado, 25.i.1946, *L. Rossi 6799* (UPS!, lectotype [**designated here**]; LIL[n.v.], hb. Lamb (location unknown) [n.v.], isolectotypes).

Syn. nov. ***Acarospora punae*** **I.M. Lamb**, Lilloa 14: 234. 1948. **ARGENTINA. TUCUMÁN PROV.:** Valle de Tafé, western slope of Cumbre Porterillo, 3600 m, xi.1947, on the overhung side of a large schistose rock, *I.M. Lamb 5290* (UPS!, lectotype [**designated here**]; LIL[n.v.], hb. Lamb, location unknown [n.v.], isolectotypes).

Notes. – *Acarospora thelomma* differs from *A. boliviana* in forming an expanded exciple in elevated parathecial crowns and consequently has a hymenium 200-280 µm high. Like *A. boliviana* it becomes scabrid in old thalli. *Acarospora punae* is an immature form of *A. thelomma* in which the apothecia are just emerging from the thallus and the elevated parathecial crowns are not fully formed. The hymenium is consequently lower at this ontogenic stage (135-160 µm). It is made a synonym of *A.*

thelomma here. As with *A. boliviana,* the younger thallus of *A. punae* is only partially scabrid. If further studies reveal that the formation of a wider parathecium and elevated parathecial crown is a variable character of *A. boliviana*, then they should both be treated as synonyms of *A. boliviana.*

6) *Acarospora trachyticola* (Müll. Arg.) Hue, Morph. et Anat. 163. 1909. TYPE: **PERU**: in Andibus, collo Inter Lampa et Arequipa, *Lechler 3316* (K!, holotype).

Notes. – For a description and illustrations of this species see Knudsen et al. (2011). This brown effigurate species that lacks exolites has been reported from Peru, where it is common, Argentina and Venezuela (Knudsen et al. in press.). *Acarospora trachyticola* is here reported new for Ecuador from the Galapágos Islands. The specimen is rather poor but marginal lobes can be seen and the internal anatomy is consistent with the recently published description.

Specimen examined. – **ECUADOR. GALÁPAGOS PROV.:** SOUTH-EASTERN/CENTRO SUR: Santiago, Isla Santiago, summit of Cerro Gavilan, inner N- and NE-exposed crater rim, in crevices, 0°12'20"S 90°47'3"W, 840 m, 23.iii.2006, on lava rock, *A. Aptroot 65667* (CDS 32258!).

7) *Caeruleum heppii* (Nägeli ex Körb.) K. Knudsen & L. Arcadia, Opuscula Philolichenum 11: 24. 2012. TYPE: "Auf Kalkstein – Findlingen", *J. Hepp s.n. = Fletch. Eur. 57* (NY!, lectotype [designated by Harris and Knudsen (2005)]; NY!, isolectotype).

Notes. – For a description of this species see Knudsen (2007b, as *Myriospora heppii*). For an explanation of the new genus see Arcadia and Knudsen (2012). This small, brown pioneer species is frequent in Europe and North America but easily overlooked. The collection by Palice was made on a piece of calcareous brick. The genus and species is reported new for South America and Ecuador.

Specimen examined. – **ECUADOR. COTOPAXI PROV.:** Cotopaxi National Park, west of the volcano Cotopaxi, surroundings of "Museo", 3500-3600 m, 22.vi.1999, on fragment of roofing-tile semi-immersed in the ground, *Z. Palice 3305* (PRA!).

8) *Polysporina simplex* (Taylor) Vězda, Folia Geobot. Phytotax. 13: 399. 1978. TYPE: **UNITED KINGDOM:** sine loc, *Rev. Hugh Davies* (BM!, holotype).

Notes. – For a description of this species see Knudsen (2007c). Small but typical specimens of this cosmopolitan species were collected on volcanic stones by Palice in Ecuador. It is here reported new for South America from Ecuador. It was previously reported from the Southern Hemisphere from New Zealand byGalloway (2007).

Specimens examined. – **ECUADOR. CARCHI PROV.:** Volcán Chíles, slope above Laguna Verde, ca. 0°48'N 77°55'30"W, 4050 m, 12.vii.1999, on stones in former sulphur quarry, *Z. Palice 3281* (PRA!). **ECUADOR. CHIMBORAZO PROV.:** Volcán Chimborazo, W slope, arenal with dispersed shrubs, 01°27'56"S 78°53'57"W, 4170-4180 m, 22.ix.2000, on small stone, *Z. Palice et. al. 4332* (PRA!).

CHECKLIST OF SOUTH AMERICAN ACAROSPORACEAE

This continuing study now recognizes from South America 27 species in 6 genera of Acarosporaceae (see the checklist below) (Knudsen 2007a; Knudsen et al. 2008; Knudsen & Flakus 2009; Knudsen et al. 2010; Knudsen et al. in press.).

***Acarospora altoandina* H. Magn**. (Knudsen et al. 2008)
***Acarospora americana* H. Magn.** (herein)
***Acarospora boliviana* H.Magn.** (Knudsen et al. 2008)
***Acarospora brouardii* B. de Lesd.** (Knudsen et al. 2008)
***Acarospora catamarcae* H. Magn.** (herein)
***Acarospora chrysops* (Tuck.) H. Magn**. (Knudsen 2007a, Knudsen et al. 2008)

Acarospora dissecta **K. Knudsen & Flakus** (Knudsen et. al. in press.)
Acarospora lorentzii **(Mull. Arg.) Hue** (Knudsen et al. 2008, Knudsen et al. in press.)
Acarospora obnubila **H. Magn.** (Knudsen et al. 2008)
Acarospora obpallens **(Nyl. ex Hasse) Zahlbr.** (Knudsen et al. 2008)
Acarospora ramosa **K. Knudsen & Flakus** (Knudsen & Flakus 2009)
Acarospora rhabarbarina **Hue** (Knudsen 2007, Knudsen et al. 2008, and herein).
Acarospora rouxii **K. Knudsen, Elix & Reeb** (Knudsen 2007a, Knudsen et al. 2008)
Acarospora sparsiuscula **H. Magn.** (herein)
Acarospora strigata **(Nyl.) Jatta** (Knudsen 2007a, Knudsen et al. 2008)
Acarospora subcastanea **(Nyl.) Hue** (Knudsen et al. 2008, as *A. bullata*; Knudsen et al. 2010)
Acarospora terrigena **K. Knudsen, Elix & Reeb** (Knudsen et al. 2008)
Acarospora thelomma **M. Lamb** (Knudsen 2011)
Acarospora trachyticola **(Müll. Arg.) Hue** (Knudsen et al. in press., and herein)
Acarospora xanthophana **(Nyl.) Jatta** (Knudsen et al. 2008)
Caeruleum heppii **(Nägeli ex Körb.) K. Knudsen & L. Arcadia** (herein)
Myriospora smaragdula **(Wahlenb. ex Ach.) Uloth** (Knudsen et. al. in press., as *Silobia smaragdula*)
Pleopsidium chlorophanum **(Wahlenb.) Zopf** (Knudsen et al. 2008)
Polysporina simplex **(Taylor) Vězda** (herein)
Polysporina urceolata **(Anzi) Brodo** (Knudsen et al. in press.)
Sarcogyne brunnea **K. Knudsen & Flakus** (Knudsen et al. in press.)
Sarcogyne terrena **H. Magn.** (Knudsen et al. in press.)

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New records of lichenicolous fungi from Bolivia

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ABSTRACT. – Fifty-five new records of lichenicolous fungi from Bolivia are presented. Ten species are new to the Southern Hemisphere: *Buelliella lecanorae*, *Cornutispora pyramidalis*, *Dactylospora tegularum*, *Epigloea urosperma*, *Marchandiobasidium aurantiacum*, *Monodictys epilepraria*, *Polycoccum* aff. *rubellianae*, *Roselliniella euparmeliicola*, *Rosellinula frustulosae*, *Stigmidium eucline* and *S. gyrophorarum*. Seven species are new to South America: *Cornutispora lichenicola*, *C. pittii*, *Lichenopeltella physciae*, *L. ramalinae*, *Lichenostigma rugosa*, *Minutoexcipula tuckerae* and *Opegrapha brigantina*. Thirty-one species are reported for the first time for Bolivia. Several extensions of the known hosts are reported as well. Three host lichens, *Ochrolechia africana*, *Pertusaria velata* and *Placynthiella dasaea*, are reported as a new to Bolivia.

INTRODUCTION

Despite the fact that Bolivia is among the most biologically diverse countries in the world, its lichenized and lichenicolous fungi have remained almost completely unexplored. So far only twenty one species and one variety of lichenicolous fungi have been recorded from Bolivia; these are *Abrothallus parmeliarum* (Sommerf.) Arnold s.l. (Feuerer & Sipman 2005), *Arthonia destruens* Rehm. (Feuerer & Sipman 2005), *Arthrorhaphis aeruginosa* R. Sant. & Tønsberg (Flakus et al. 2008), *Cercidospora soror* Obermayer & Triebel (Hafellner & Obermayer 1995), *Corticifraga peltigerae* (Fuckel.) D. Hawksw. & R. Sant. (Hawksworth & Santesson 1990), *Endococcus apiciicola* (J. Steiner) R. Sant. (Diederich 2003), *Keratosphaera antoniana* Flakus, Farkas & Lücking (Farkas 2010), *Lichenoconium lecanorae* (Jaap) D. Hawksw. (Diederich 2003), *Lichenopeltella thamnoliae* R. Sant. (Zhurbenko 2012), *Merismatium corae* (Pat.) Etayo & R. Sant. (Etayo 2010a), *Muellerella pygmaea* (Körb.) D. Hawksw. (Feuerer & Sipman 2005), *M. ventosicola* (Mudd) D. Hawksw. (Feuerer & Sipman 2005), *Ovicuculispora parmeliae* (Berk. & Curt.) Etayo (Flakus et al. 2006), *Phacopsis oxyspora* (Tul.) Triebel & Rambold [including var. *defecta* (Tul.) Triebel & Rambold] (Diederich 2003, Nylander 1859, Triebel et al. 1995), *Polycoccum microcarpum* Diederich & Etayo (Flakus et al. 2008), *Roselliniella cladoniae* (Anzi) Matzer & Hafellner (Flakus et al. 2008), *Skyttea carboneae* Diederich & Etayo (Diederich & Etayo 2000), *Sphaerellothecium cladoniae* (Alstrup & Zhurb.) Hafellner (Flakus et al. 2008), *Tremella cladoniae* Diederich & M. S. Christ. (Diederich 1996, Flakus et al. 2008), *T. lobariacearum* Diederich & M. S. Christ. (Diederich 2003), and *T. parmeliarum* Diederich (Etayo 2010a, Feuerer & Sipman 2005). If comparing Bolivia to other South American countries (e.g., Colombia, Peru, Chile; see (Etayo 2002, 2010a; Etayo & Sancho 2008)) at least 400-500 species are expected to be discovered. Because of that fact, our current interests have been focused on that group of fungi in Bolivia (see Flakus 2010).

In this paper we present new records of fifty-five species of which ten are new to the Southern Hemisphere, seven new to South America, and thirty-one are new to Bolivia. In addition, three host lichen species, *Ochrolechia africana* Vain., *Pertusaria velata* (Turner) Nyl. and *Placynthiella dasaea* (Stirt.) Tønsberg, are recorded for the first time to Bolivia.

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MATERIALS AND METHODS

Most of the examined specimens were collected by the authors in Bolivia and are deposited in KRAM, LPB, UGDA and herb. Flakus, with some duplicates deposited in the personal herbarium of Javier Etayo (herb. Etayo). The abbreviations AF, JQ, MK and PR in the citations of examined specimens stand for A. Flakus, J. Quisbert, M. Kukwa and P. Rodriguez, respectively.

Morphology and anatomy of the fungi were examined by using a NIKON SMZ800 and a NIKON ECLIPSE 80*i* (DIC) microscopes. Squash preparations were studied in water, KOH solution (K) or Congo Red, and for ascus structure in Lugol's iodine solution without (I) or with pre-treatment with KOH (K/I). All measurements were made in water.

THE SPECIES

1. *Abrothallus hypotrachynae* Etayo & Diederich

NOTES. – In South America the species was previously found in Brazil, Colombia, Guatemala, Peru and Dominican Republic (Etayo 2002, 2010a; Etayo & van den Boom 2006); here it is reported as new to Bolivia. Our specimens agree in general with the description provided by Etayo (2002), except that the ascospores are slightly narrower (4–5 µm; originally 5–5.5 µm) and the hypothecium does not give an obvious reaction with K.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. NOR YUNGAS: PNANMI Cotapata, by Sillu Tincara pre-Colombian route, 16°16'33"S, 67°52'60"W, 3429 m, Yungas montane cloud forest, on thallus of *Hypotrachyna* sp., *AF 16989, 16991 & PR* (KRAM, LPB, herb. Flakus).

2. *Abrothallus parmeliarum* (Sommerf.) Nyl. s.l.

NOTES. – This is a widespread species, which was known in South America previously from Bolivia (Feuerer & Sipman 2005), Chile (Etayo & Sancho 2008) and Peru (e.g. Etayo 2010a). It has been reported from several parmelioid lichens (e.g., Diederich 2003, Etayo 2010a, Etayo & Sancho 2008, Feuerer & Sipman 2005, Kocourková 2000); in this paper it is reported for the first time from thalli of *Psiloparmelia*.

Specimen examined. – **BOLIVIA. DEPT. ORURO:** PROV. SAJAMA: PN Sajama, Jecha K'ala 25 km of Sajama village, 18°09'52"S, 68°49'08"W, 4184 m, Puna Sureña, Pajonales vegetation, on thallus of *Psiloparmelia* sp., *AF* 16627.1 & *PR* (LPB).

3. *Arthonia epiphyscia* Nyl.

NOTES. – This species was previously known in South America from Argentina, Chile and Peru (Etayo 2010a, Hafellner et al. 2002, Wedin 1994); it is here reported as new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'36"S, 64°29'33"W, 2195 m, Tucumano-Boliviano montane forest with *Alnus acuminata*, on thallus of *Physcia* sp., *AF 19850 & J. Quisbert* (LPB, herb. Flakus).

4. *Arthonia molendoi* (Heufl. ex Frauenf.) R. Sant.

NOTES. – Until now this species was known in South America only from Chile (Etayo & Sancho 2008). Here it is reported as new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. POTOSÍ:** PROV. DANIEL CAMPOS: by Puerto Chuvica village near Salar Uyuni, 20°36'06"S, 67°35'50"W, 3670 m, open semi-desert high Andean area, on thallus of saxicolous *Caloplaca* sp., *AF 14721 & PR* (KRAM, LPB).

5. *Buelliella lecanorae* Suija & Alstrup

NOTES. – New to the Southern Hemisphere. Previously found only in Europe (Estonia, Germany and Italy) (Brackel 2009, 2011; Suija & Alstrup 2004).

Specimen examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'54"S, 64°29'28"W, 2056 m, Tucumano-Boliviano montane forest with *Alnus acuminata* and *Podocarpus* sp., on thallus of corticolous *Lecanora* sp., *AF 19958.1 & JQ* (LPB).

6. *Buelliella poetschii* Hafellner

NOTES. – This species was recently described from *Endocarpon* by Hafellner et al. (2008) from Austria, Sweden and the U.S.A. In South America it was previously reported from Peru (Etayo 2010a), and here for the first time from Bolivia, in both countries it was found on *Catapyrenium* s.l.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. FRANZ TAMAYO: near comunidad de Ulla Ulla, in Socondori Chico hill, 15°0.520'S, 68°13.866'W, 4500 m, high Andean vegetation, on thallus of *Catapyrenium* s.l., *PR 1348* (KRAM, LPB, herb. Flakus).

7. *Clypeococcum grossum* (Körb.) D. Hawksw.

NOTES. – In South America this species was previously known only from Peru (Etayo 2010a), and here it is reported as new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. OMASUYOS: Tajani near Achacachi, 15°36'49"S, 69°04'02"W, 3869 m, Puna Húmeda vegetation, on thallus of *Umblicaria* sp., *AF 17806.1 & PR* (KRAM, LPB, herb. Flakus).

8. *Cornutispora lichenicola* D. Hawksw. & B. Sutton

NOTES. – This species is here reported as new to South America. Previously it was recorded in Europe (several countries), Africa (Canary Islands, Mauritius), Australia and North America (U.S.A., Mexico) (e.g., Hafellner et al. 2002, Hawksworth 2003, Kukwa et al. 2002). *Ochrolechia africana* is also reported here as new to Bolivia. It is also a new host for the fungus, which previously had been recorded on other species of the genus (Kocourková 2000).

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. NOR YUNGAS: Coroico village, 16°11'10"S, 67°43'16"W, 1550 m, Yungas montane forest, on disc and apothecial margin of *Ochrolechia africana*, *AF 16423.4 & PR* (KRAM, LPB).

9. *Cornutispora pittii* D. Hawksw. & Punith.

NOTES. – This species is here reported as new to South America. So far it has been known only from a single locality in Australia (Punithalingam 2003). *Canoparmelia amazonica* (Nyl.) Elix & Hale is a new host for the fungus.

Specimen examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. ITURRALDE: near San Pedro village, 13°43'59"S, 68°00'38"W, alt. 250 m, on thallus of *Canoparmelia amazonica* growing on bark of tree, *MK 6889* (UGDA; in specimen of *C. amazonica*).

10. *Cornutispora pyramidalis* Etayo

NOTES. – This species was recently described by Etayo (2010c) from Spain and Portugal (the Azores). The Bolivian record presented here is the first from the Southern Hemisphere. Conidia in the studied material were slightly larger (4–6 µm from one apex of the conidium to the other in our material vs. only to 5 µm) than reported by Etayo (2010c).

Specimen examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'36"S, 64°29'33"W, 2195 m, Tucumano-Boliviano montane forest with *Alnus acuminata*, on thallus of *Hypotrachyna* sp. s.l., *AF 19835.1 & JQ* (LPB).

11. *Dactylospora homoclinella* (Nyl.) Hafellner

NOTES. – This species was reported from several localities in Eurasia (Hafellner 1979; Zhurbenko 2004) and later from a single South American locality in Peru (Etayo 2010a). It is here reported as new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. COCHABAMBA:** PROV. QUILLACOLLO: East Cordillera, area of Incarraya-Sipesipe, 17°28'39S" 64°21'43"W, 2846 m, semi-desert open area, on thallus of saxicolous *Lecanora* sp., *AF 4935* (KRAM, LPB).

12. *Dactylospora lobariella* (Nyl.) Hafellner

NOTES. – This species is new to Bolivia. In South America it was known only from Chile (Galloway & Quilhot 1998, Kondratyuk & Galloway 1995). The latter authors reported the species from South America without indication of the country; however, it was reported to parasitize *Pseudocyphellaria coppinsii* D.J. Galloway, which is endemic to Chile (see Galloway 1992). *Lobariella pallida* (Hook.f.) Moncada & Lücking appears to be a new host of this fungus.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. NOR YUNGAS: Coroico village, 16°11'10"S, 67°43'16"W, 1550 m, Yungas montane forest, on thallus of *Lobariella pallida, AF 16420.2, 16429*.1 & *PR* (KRAM, LPB, UGDA, herb. Flakus). **DEPT. TARIJA:** PROV. ANICETO ARCE: Filo de Sidras, 2 hours drive of Tarija, 22°14'50"S, 64°33'28"W, 1064 m, Tucumano-Boliviano submontane forest, on thallus of *Sticta* sp., *AF 18518.1* (KRAM, LPB).

13. *Dactylospora porphyrea* Hafellner & Kalb

NOTES. – In South America *Dactylospora porphyrea* has been reported so far from Brazil, Colombia and Ecuador (Etayo 2002, Hafellner 1985a). The species is here reported as new to Bolivia. Our specimen agrees in general with the characters presented by Hafellner (1985a), except that the pigmentation of the excipulum and epihymenium is pale brown, not dark orange-brown as previously reported.

Specimen examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'54"S, 64°29'28"W, 2056 m, Tucumano-Boliviano montane forest with *Alnus acuminata* and *Podocarpus* sp., on thallus of *Brigantiaea* sp., *AF 19974 & JQ* (LPB).

14. *Dactylospora tegularum* (Arnold) Hafellner

NOTES. – This species was known previously only from Germany (Hafellner 1979; Triebel & Scholz 2001), and is here reported for the first time from the Southern Hemisphere.

Specimen examined. – **BOLIVIA. DEPT. ORURO:** PROV. SAJAMA: PN Sajama, near Sajama village, 18°07'49"S, 68°56'54"W, 4437 m, Puna sureña, Tholares vegetation, on thallus of saxicolous *Caloplaca* sp., *AF 16468 & PR* (LPB).

15. *Epigloea urosperma* Döbbeler

NOTES. – *Epigloea urosperma* is presently known only from scattered European localities (Döbbeler 1994; Santesson et al. 2004; Pérez-Ortega & Barreno 2006; Kukwa & Flakus 2009). We report it here as new to the Southern Hemisphere. The host *Placynthiella dasaea* is recorded here as new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. SANTA CRUZ:** PROV. CABALLERO: East Cordillera, Siberia region near La Palma village, 17°49'12"S, 64°40'28"W, 2582 m, Yungas montane cloud forest, on thallus of *Placynthiella dasaea*, *AF 4654.2* (LPB, herb. Flakus).

16. *Gyalideopsis stereocaulicola* Etayo

NOTES. – This species, recently described from Peru and Costa Rica (Etayo 2010a), is here reported as new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. NOR YUNGAS: below Unduavi village, near Rio Unduavi, 16°18'50" S, 67°54'35" W, 3135 m, Yungas cloud forest, on thallus of saxicolous *Stereocaulon*, *AF 22222.1* (KRAM, LPB).

17. *Lichenoconium cargillianum* (Linds.) D. Hawksw.

NOTES. – This rare species was known in South America only from Chile (Etayo & Sancho 2008). It is reported here as new to Bolivia. *Hypotrachyna pluriformis* (Nyl.) Hale is a new host species.

Specimen examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'36"S, 64°29'33"W, 2195 m, Tucumano-Boliviano montane forest with *Alnus acuminata*, on apothecial margin of *Hypotrachyna pluriformis*, *AF 19881 & JQ* (LPB).

18. *Lichenopeltella communis* Etayo

NOTES. – The species is reported here as new to Bolivia; until now it was known from several localities in Colombia, Ecuador and Peru (Etayo 2010a). The species can be easily distinguished from *Lichenopeltella hypotrachynae* Diederich (see Etayo 2010a), the other species of the genus growing on *Hypotrachyna*, by morphological characters. Catathecia of *L. communis* are crowded on the host thallus and very applanate with a central pointed apex; the fungus causes darkening of the host thallus. In *L. hypotrachynae* the ascomata are larger, subglobose and solitary; they are formed on a net of hyphae of similar structure to catathecia. Other microscopic features which distinguish these species were outlined by in Etayo (2010a).

Specimen examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'36"S, 64°29'33"W, 2195 m, Tucumano-Boliviano montane forest with *Alnus acuminata*, on thallus of *Hypotrachyna* sp., *AF 19835 & JQ* (LPB).

19. *Lichenopeltella heterodermiae* Diederich

NOTES. – This species was described from Papua New Guinea (Aptroot et al. 1997) and later also reported from Colombia (Etayo 2002). Here it is reported as new to Bolivia. The Bolivian specimen was not fully mature, as all the asci were young and mostly without ascospores. The few ascospores were observed slightly narrower (26 × 6 µm) than reported in protologue (24–28 × 7.5–8.5 µm; Aptroot et al. (1997)). However, other features and the host agree with the description, and therefore the specimen is referred to that species.

Specimen examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Serranía de Propiedad Arnold, 22°13'19"S, 64°33'41"W, 1309 m, Tucumano-Boliviano montane forest, on thallus of *Heterodermia* sp., *AF* 18845 (LPB).

20. *Lichenopeltella physciae* Diederich

NOTES. – This species is here reported for the first time to South America. Until now it was known only from Papua New Guinea and the Ivory Coast (Aptroot et al. 1997).

Specimen examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: near campamento de guardaparques, 2 hours drive of Tarija, 22°14'56"S, 64°32'55"W, 883 m, Tucumano-Boliviano secondary submontane forest, on thallus of *Physcia* sp., *AF 18380.1* (LPB).

21. *Lichenopeltella ramalinae* Etayo & Diederich

NOTES. – This is the first report of *Lichenopeltella ramalinae* from South America. Previously it was known from Europe (Estonia, British Isles, Portugal), the Canary Islands, Papua New Guinea and eastern Siberia (Aptroot et al. 1997, Hawksworth 2003, Suija 2005, van den Boom & Etayo 2000). *Ramalina celastri* (Spreng.) Krog & Swinscow is a new host species.

Specimens examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Filo de Sidras, 2 hours drive of Tarija, 22°14'50"S, 64°33'28"W, 1064 m, Tucumano-Boliviano submontane forest, on thallus of *Ramalina celastri*, *AF 18588.3* (KRAM, LPB, UGDA, herb. Flakus).

22. *Lichenostigma maureri* Hafellner

NOTES. – This species was reported in South America from Argentina (Hafellner et al. 2002), Chile (Etayo & Sancho 2008), Colombia (Etayo 2002) and Peru (Etayo 2010a, Hafellner et al. 2002); here it is reported as new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. CAMACHO: Pacoamba cerca Wila Kala, 15°24'40"S, 69°04'24"W, 4283 m, Puna Húmeda vegetation, on thallus of *Ramalina* sp., *AF 17697 & PR* (KRAM, LPB, herb. Flakus).

23. *Lichenostigma rugosum* G. Thor

NOTES. – So far this species has been known from the Northern Hemisphere (Hafellner et al. 2002, Thor 1985) and also Australia (Thor 1995). The Bolivian record is the first one from South America.

Specimens examined. – **BOLIVIA. DEPT. COCHABAMBA:** PROV. QUILLACOLLO: East Cordillera, area of Incarraya-Sipesipe, 17°28'39"S, 64°21'43"W, 2846 m, semi-desert open area, on thallus and apothecia of *Diploschistes* sp., *AF 4951* (KRAM, LPB, UGDA, herb. Flakus).

24. *Marchandiobasidium aurantiacum* Diederich & Schultheis

NOTES. – This species is widespread in Europe, and also known from North America (U.S.A.) (Diederich & Lawrey 2007), especially in the anamorph state. Here we report it is reported as new to the Southern Hemisphere. In the studied specimen only the anamorph state was present.

Specimens examined. – **BOLIVIA. DEPT. SANTA CRUZ:** PROV. CORDILLERA: Charrata village, PNANMI Kaa-Iya del Gran Chaco, 18°28'05"S, 62°05'43"W, 307 m, Chaqueño forest, on thallus of corticolous *Physcia* sp., *AF 20128 & JQ* (KRAM, LPB).

25. *Merismatium corae* (Pat.) Etayo & R. Sant.

NOTES. – This species was previously known from only a few localities in Bolivia, Mexico and Peru (Etayo 2010a). This is the first record on *Dictyonema minus* Lücking et al.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. LARECAJA: la Cumbre de Sorata, 15°53'06"S, 68°38'55"W, 4787 m, high Andean open vegetation, on *Dictyonema glabratum* growing on mosses over stone, *MK 8418* (LPB, UGDA; in specimen of *D. glabratum*). PROV. MURILLO: near Cumbre pass, 16°21'59"S, 68°02'37"W, 4604 m, high Andean Puna vegetation, on thallus of *Dictyonema minus*, *AF 5769* (KRAM, LPB); ibid. 16°19'18"S, 68°04'42"W, 4550 m, on thallus of *D. minus*, *AF 8534* (LPB, herb. Flakus). Bolivia,

26. *Minutoexcipula tuckerae* V. Atienza & D. Hawksw.

NOTES. – This species is here reported as new to South America. It has previously been reported from North America (Atienza & Hawksworth 1994) and Australia (Hafellner 1994).

Specimens examined. – **BOLIVIA. DEPT. SANTA CRUZ:** PROV. CORDILLERA: gasoducto Bolivia-Brazil KP 164, 60 km of Tucavaca colony, PNANMI Kaa-Iya del Gran Chaco, 18°27'29"S, 61°23'01"W, 292 m, Chaqueño forest, on thallus of corticolous *Pertusaria* sp., *AF 18971 & JQ* (KRAM, LPB, herb. Flakus).

27. *Monodictys epilepraria* Kukwa & Diederich

NOTES. – This species is here newly reported from the Southern Hemisphere. Previously it was known only from Europe and the Canary Islands (e.g., Brackel 2009, Diederich et al. 2009, Ertz & Diederich 2008, Kukwa & Diederich 2005, Kukwa 2008).

Specimen examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'54"S, 64°29'28"W, 2056 m, Tucumano-Boliviano montane forest with *Alnus acuminata* and *Podocarpus* sp., on thallus of *Lepraria lobificans*, *AF 19946.1 & JQ* (LPB).

28. *Muellerella erratica* (A. Massal.) Hafellner & V. John

NOTES. – According to Etayo (2010a) this species was known in South America from a single Peruvian locality. We report it here as new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. ORURO:** PROV. SAJAMA: PN Sajama, near Sajama village, 18°07'49"S, 68°56'54"W, 4437 m, Puna Sureña, Tholares vegetation, on thallus of saxicolous *Immersaria* sp., *AF 16495 & PR* (KRAM, LPB).

29. *Nectriopsis lichenophila* (Speg.) Etayo

NOTES. – So far the species has been found in Brazil and Colombia (Etayo 2002); here it is reported for the first time in Bolivia.

Specimen examined. – **BOLIVIA. DEPT. SANTA CRUZ:** PROV. CABALLERO: East Cordillera, Siberia village, 17°49'38"S, 64°45'14"W, 3480 m, open area near montane cloud forest, on thallus of *Heterodermia* sp., *AF 4493.1* (LPB).

30. *Nigromacula uniseptata* (D. Hawksw.) D. Hawksw.

NOTES. – This species was known in South America only from Colombia (sub *N. hypotrachynae* Etayo; Etayo 2002); elsewhere it was reported from the British Isles (Hawksworth 2003) and the Canary Islands (sub *Vouauxiella uniseptata* D. Hawksw.; Etayo 1996). Here it is reported as new to Bolivia.

Specimen examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. CAMACHO: Pacoamba near Wila Kala, 15°24'40"S, 69°04'24"W, 4283 m, Puna Húmeda vegetation, on thallus of *Hypotrachyna andensis*, *AF 17764 & PR* (LPB).

31. *Opegrapha brigantina* Hafellner

NOTES. – This is the first record of *Opegrapha brigantina* from South America. Previously the species was known from Africa (Kenya and Tanzania) and Australia (Hafellner 1985a).

Specimens examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'54"S, 64°29'28"W, 2056 m, Tucumano-Boliviano montane forest with *Alnus acuminata* and *Podocarpus* sp., on thallus of *Brigantiaea* sp., *AF 19996 & JQ* (LPB, herb. Flakus).

32. *Opegrapha melanospila* Müll. Arg.

NOTES. – In South America this species was previously reported from Brazil (Diederich 2003) and Venezuela (Müller 1877). Here it is reported for the first time from Bolivia. The species shows a greater variation in ascospore length than stated by Müller (1877). Originally ascospores were reported as 13–14 µm long, but in our material they exceeded 17 µm.

Specimens examined. – **BOLIVIA. DEPT. SANTA CRUZ:** PROV. J. M. DE VELASCO: near Florida village, PN Noel Kempff Mercado, 14°35'50"S, 61°50'46"W, 215 m, bosque Cerrado vegetation, on thallus of *Parmotrema* cf. *reticulatum*, *AF 15726 & PR* (KRAM, LPB, herb. Flakus).

33. *Phacopsis fusca* (Triebel & Rambold) Diederich

NOTES. – This species was reported in South America from Venezuela (Diederich 2003; Triebel et al. 1995) and Peru (Etayo 2010a). Here the first Bolivian record is presented.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. CAMACHO: Pacoamba near Wila Kala, 15°24'40"S, 69°04'24"W, 4283 m, Puna Húmeda vegetation, on thallus of *Psiloparmelia* sp., *AF 17724.1 & PR* (LPB, herb. Flakus).

34. *Phacopsis oxyspora* (Tul.) Triebel & Rambold

NOTES. – The species is widely distributed in South America and was known from Bolivia, Brazil, Chile, Colombia, Peru and Uruguay (Diederich 2003; Etayo 2002, 2010a; Etayo & Osorio 2004; Etayo & Sancho 2008; Santesson 1994; Triebel et al. 1995; Wedin 1994). Triebel et al. (1995) distinguished three varieties within *Phacopsis oxyspora*, var. *defecta* Triebel & Rambold, var. *fusca* Triebel & Rambold and var. *oxyspora*, the last two differing only in the reaction of the hypothecium with Lugol's iodine. Diederich (2003) raised *P. oxyspora* var. *fusca* to the species level and reduced *P. oxyspora* var. *defecta* to a synonym of *P. oxyspora* var. *oxyspora* as he considered the iodine reaction of low taxonomic value. In our material specimens with I negative (formerly *P. oxyspora* var. *defecta*) and I+ blue reactions (*P. oxyspora* s.str., indicated with asterisk below) of the hypothecium were present.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. MURILLO: near Cumbre pass, 16º21'59"S, 68º02'37"W, 4604 m, high Andean Puna vegetation, on thallus of *Punctelia stictica*, *AF 16279.1 & PR* (KRAM, LPB); *ibid.* on thallus of *P. stictica*, *AF 16280* & PR* (KRAM, LPB, UGDA, herb. Flakus). PROV. FRANZ TAMAYO: ANMIN Apolobamba, near Puyo Puyo village, 15°56'55"S, 69°07'58"W, 4795 m, high Andean open vegetation, on thallus of *Melanelia* sp., *AF 17672.1 & PR* (KRAM). **DEPT. ORURO:** PROV. SAJAMA: PN Sajama, Jecha K'ala 25 km of Sajama village, 18°09'52"S, 68°49'08"W, 4184 m, Puna Sureña, Pajonales vegetation, on thallus of *Psiloparmelia* sp., *AF 16627 & PR* (LPB).

35. *Phaeosporobolus alpinus* R. Sant., Alstrup & D. Hawksw.

NOTES. – This species is here reported new to Bolivia. In South America it was known previously from Argentina, Chile and Colombia (Etayo 2002, Etayo & Sancho 2008, Wedin 1994).

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. NOR YUNGAS: Coroico village, 16°11'10"S, 67°43'16"W, 1550 m, Yungas montane forest, on thallus of corticolous *Ochrolechia* sp., *AF 16423.3 & PR* (KRAM, LPB).

36. *Phaeosporobolus minutus* Etayo

NOTES. – This species was recently described from numerous localities in Chile (Etayo & Sancho 2008). It is here reported new to Bolivia. Additionally, it is reported here for the first time from the thallus of *Lecanora* sp. (so far it is known only on genera *Coccotrema* Müll. Arg. and *Pertusaria* DC.). *Lecanora* Ach. is not related to the previously reported host taxa, but as the characters of the material agree with the protologue (conidia up to 11 µm wide, consisting of 4–9(–10) cells), we ascribe our sample to *P. minutus*.

Specimens examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Filo de Sidras, 2 hours drive of Tarija, 22º14'50"S, 64º33'28"W, 1064 m, Tucumano-Boliviano submontane forest, on corticolous *Lecanora* sp., *AF 18574.1* (KRAM, LPB).

37. *Phaeosporobolus usneae* D. Hawksw. & Hafellner

NOTES. – This species previously was known in South America from Argentina (Diederich 2003, Hafellner et al. 2002), Chile (Etayo & Sancho 2008), Colombia (Etayo 2002) and Peru (Etayo 2010a). Here it is reported new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. CAMACHO: Pacoamba near Wila Kala, 15°24'40"S, 69°04'24"W, 4283 m, Puna Húmeda vegetation, on thallus of *Ramalina* sp., *AF 17743 & PR* (KRAM, LPB).

38. ***Pleoscutula hypotrachynae*** **Etayo & Diederich**

NOTES. – This species was described from Colombia (Etayo 2002) and is here reported as new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'36"S, 64°29'33"W, 2195 m, Tucumano-Boliviano montane forest with *Alnus acuminata*, on thallus of *Hypotrachyna* sp., *AF 19896 & JQ* (KRAM, LPB, herb. Flakus).

39. ***Polycoccum dictyonematis*** **Etayo & R. Sant.**

NOTES. – This recently described species, known from Brazil, Chile, Ecuador and Peru (Etayo 2010a), is reported here as new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. NOR YUNGAS: between Coroico and La Paz towns, 16°13'09"S, 67°49'32"W, 2600 m, open area near Yungas montane cloud forest, on thallus of *D. glabratum*, *AF 11842, 11847, 11854 & MK 7201a* (KRAM, LPB, UGDA, herb. Flakus). **DEPT. SANTA CRUZ:** PROV. CABALLERO: East Cordillera, Siberia region near La Palma village, 17°49'12"S, 64°40'28"W, 2582 m, Yungas montane cloud forest, on thallus of *Dictyonema* sp., *AF 4590.1* (LPB).

40. ***Polycoccum*** **aff.** ***rubellianae*** **Calat. & V. Atienza**

NOTES. – Our specimen has rather large perithecia (150–200 µm wide), ascospores measuring 12–16 × 6–8 µm, and partly bleaching galls. Several *Polycoccum* species have been reported as parasitizing *Caloplaca* and related genera, but *P. rubellianae*, a taxon recently described from Spain (Atienza et al. 2003), is the most similar in ascospore dimensions ((10–)11–14(–15) × (5.5–)6–7 µm). It differs, however, in having smaller ascomata (85–120 µm wide) and galls which are not discoloured (Atienza et al. 2003). The identity of our material needs further study.

Specimens examined. – **BOLIVIA. DEPT. SANTA CRUZ:** PROV. CABALLERO: East Cordillera, Siberia village, 17°49'38"S, 64°45'14"W, 3480 m, open area near Yungas montane cloud forest, on thallus of saxicolous *Caloplaca* sp., *AF 4839* (KRAM, LPB, herb. Flakus).

41. ***Polycoccum vermicularium*** **(Linds.) D. Hawksw.**

NOTES. – This species was known in South America from Argentina, Chile and Peru (see Etayo 2010a, Etayo & Sancho 2008, Hawksworth 1985, Hawksworth & Diederich 1988), and is here reported as new to Bolivia.

Specimen examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. FRANZ TAMAYO: ANMIN Apolobamba, Socondori Chico near Ulla Ulla village, 15°00'38"S, 69°13'48"W, 4479 m, high Andean open vegetation, on thallus of *Thamnolia papelillo*, *AF 17479.1 & PR* (LPB).

42. ***Roselliniella euparmeliicola*** **Millanes & D. Hawksw.**

NOTES. – So far the species was known only from the thallus of *Parmelia meiophora* Nyl. from the type locality in China (Yunnan Province) (Hawksworth et al. 2010). Here we report it from another host, *Hypotrachyna* sp., and for the first time from the Southern Hemisphere.

Specimens examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'36"S, 64°29'33"W, 2195 m, Tucumano-Boliviano montane forest with *Alnus acuminata*, on thallus of *Hypotrachyna* sp., *AF 19861 & JQ* (LPB, herb. Flakus).

43. ***Roselliniella papuana*** **Diederich**

NOTES. – This species was previously known in South America from Colombia (Etayo 2002) and is here reported as new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. COCHABAMBA:** PROV. CHAPARE: near Incachaca village, 17°14'13"S, 65°49'02"W, 2294 m, Yungas montane cloud forest, on thallus of *Usnea* sp., *AF 8176.1* (LPB). **DEPT. TARIJA:** PROV. ANICETO ARCE: Filo de Sidras, 2 hours drive of Tarija, 22°14'50"S, 64°33'28"W, 1064 m, Tucumano-Boliviano submontane forest, on thallus of *Usnea* sp., *AF 18436, 18558* (KRAM, LPB); ibid. Serranía de Propiedad Arnold, 22°13'19"S, 64°33'41"W, 1309 m, Tucumano-Boliviano montane forest, on thallus of *Usnea* sp., *AF 18846* (herb. Flakus).

44. ***Rosellinula frustulosae*** **(Vouaux) R. Sant**

NOTES. – This species, previously known from scattered European and Asian localities (Hafellner 1985b, Halıcı et al. 2007, Santesson 1988, Zhurbenko 2004), is reported here as new to the Southern

Hemisphere. The species is also reported for the first time on corticolous *Lecanora* species. Previously it was known from saxicolous *L. argopholis* (Ach.) Ach. and *L. frustulosa* (Dicks.) Ach. (l.c.)

Specimens examined. – **BOLIVIA**: **DEPT. SANTA CRUZ:** PROV. CORDILLERA: gasoducto Bolivia-Brazil KP 164, 60 km of Tucavaca colony, PNANMI Kaa-Iya del Gran Chaco, 18°27'29" S, 61°23'01" W, 292 m, Chaqueño forest, on corticolous *Lecanora* sp., *AF* 18965 *& JQ* (KRAM, LPB, herb. Flakus).

45. *Rosellinula kalbii* (Hafellner) Hafellner & R.W. Rogers

NOTES. – This species is here reported as new to Bolivia. Previously it was known from Argentina (Kalb et al. 1995) and Brazil (Hafellner 1985b).

Specimens examined (all on corticolous *Haematomma* spp.). – **BOLIVIA. DEPT. LA PAZ:** PROV. ITURRALDE: near Tumupasa village, 14°08'51"S, 67°53'34"W, 350 m, preandean Amazon forest, *AF 11735 & MK* (LPB); PROV. NOR YUNGAS, near Pacallo village, 16°12'10"S, 67°50'39"W, 1360 m, Yungas montane forest, *AF 11753 & MK* (KRAM, LPB). **DEPT. SANTA CRUZ:** PROV. CORDILLERA: PNANMI Kaa-Iya del Gran Chaco, gasoducto Bolivia-Brazil KP 164, 60 km of Tucavaca colony, 18°27'29"S, 61°23'01"W, 292 m, Chaqueño forest, *AF 18967, 18968, 18970 & JQ* (KRAM, LPB, herb. Flakus); ibid. Charrata village, 18°28'05"S, 62°05'43"W, 307 m, Chaqueño forest, *AF 20111 & JQ* (LPB).

46. *Skyttea caesii* Diederich & Etayo

NOTES. – This species was known in South America from Colombia (Etayo 2002) and Chile (Etayo & Sancho 2008). Here it is reported as new to Bolivia.

Specimens examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'54"S, 64°29'28"W, 2056 m, Tucumano-Boliviano montane forest with *Alnus acuminata* and *Podocarpus* sp., in soralia of corticolous sterile crustose lichens, *AF 19951 & JQ* (LPB, herb. Flakus).

47. *Skyttea carboneae* Diederich & Etayo

NOTES. – This species was previously known only from the type locality in Bolivia (Diederich & Etayo 2000), and is here reported from a second Bolivian locality.

Specimens examined. – **BOLIVIA. DEPT. SANTA CRUZ:** PROV. CABALLERO: East Cordillera, Siberia village, 17°49'38"S, 64°45'14"W, 3480 m, open area near Yungas montane cloud forest, on saxicolous *Carbonea* cf. *montevidensis*, *AF 4850* (LPB, herb. Flakus).

48. *Skyttea lecanorae* Diederich & Etayo

NOTES. – This species is here reported new to Bolivia. In South America, the species was known from Argentina, Chile and Uruguay (Diederich & Etayo 2000, Etayo & Sancho 2008).

Specimens examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'54"S, 64°29'28"W, 2056 m, Tucumano-Boliviano montane forest with *Alnus acuminata* and *Podocarpus* sp., on apothecial disc and thallus of corticolous *Lecanora* sp., *AF 19985 & JQ* (KRAM, LPB); ibid. 21°41'36"S, 64°29'33"W, 2195 m, Tucumano-Boliviano montane forest with *Alnus acuminata*, on corticolous *Lecanora* sp, *AF 19865 & JQ* (LPB, herb. Flakus).

49. *Sphaerellothecium cladoniae* (Alstrup & Zhurb.) Hafellner

NOTES. – In South America, this species was known only from Bolivia (Flakus et al. 2008), and is here reported from a second locality.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. MURILLO: near Cumbre pass, 16°21'59"S, 68°02'37"W, 4604 m, high Andean Puna vegetation, on squamules of *Cladonia* sp., *AF 16308 & PR* (KRAM, LPB).

50. *Stigmidium eucline* (Nyl.) Vězda

NOTES. – This taxon that is rather widespread in Europe (see Kocourková 2000; Kocourková & Knudsen 2010) is here reported as new to the Southern Hemisphere. *Pertusaria velata* is a new host for the species. It is also the first Bolivian record of this lichen.

Specimens examined. – **BOLIVIA. DEPT. TARIJA:** PROV. ANICETO ARCE: Papachacra, 21°41'54"S, 64°29'28"W, 2056 m, Tucumano-Boliviano montane forest with *Alnus acuminata* and *Podocarpus* sp., on thallus of corticolous *Pertusaria velata, AF 19987 & JQ* (KRAM, LPB, herb. Flakus).

51. *Stigmidium gyrophorarum* (Arnold) D. Hawksw.

NOTES. – This species is reported new to the Southern Hemisphere. Until now it was known from Asia, Europe and North America (Hafellner et al. 2002).

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. MURILLO: near Cumbre pass, 16°20'14"S, 68°02'20"W, 4672 m, high Andean Puna vegetation, on thallus of *Umbilicaria leprosa*, *AF s.n.* (LPB); ibid. 16°21'59"S, 68°02'37"W, 4604 m, high Andean Puna vegetation, on thallus of *Umbilicaria* sp., *AF 16287 & PR* (KRAM, LPB, UGDA, herb. Etayo, herb. Flakus).

52. *Tephromela cerasina* (Müll. Arg.) Rambold & Triebel

NOTES. – This taxon is reported as new to Bolivia. The species was previously reported in South America from Brazil and Venezulea (Hafellner et al. 2002).

Specimen examined. – **BOLIVIA. DEPT. BENI:** PROV. YACUMA: RBEB del Beni, near Estación Biológica del Beni, 14°51'07"S, 66°20'23"W, 175 m, island of lowland Amazon forest among savanna, on thallus of *Dirinaria* sp., *AF 17930 & F. Saavedra* (LPB).

53. *Thamnogalla crombiei* (Mudd) D. Hawksw.

NOTES. – This species was reported in South America from Chile, Colombia, and Peru (Etayo 2010a, Etayo & Sancho 2008, Hawksworth 1980b, Triebel et al. 1991). Here it is reported as new to Bolivia.

Specimen examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. FRANZ TAMAYO: Cerca de la comunidad de Ulla Ulla, en el cerro Socondori Chico, 15°0.520'S, 68°13.866'W, 4500 m, Vegetación altoandina, on thallus of *Thamnolia papelillo*, *PR 1349* (LPB).

54. *Tremella cladoniae* Diederich & M.S. Christ.

NOTES. – This species was reported from a single locality in Bolivia (Flakus et al. 2008) and a second one is presented here. In South America the species was also known from Colombia (Etayo 2002).

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. NOR YUNGAS: PNANMI Cotapata, near Urpuma colony, 16°13'20"S, 67°52'34"W, 1989 m, Yungas montane forest, on podetia of *Cladonia* sp., *AF 17262 & PR* (KRAM, LPB).

55. *Tremella lobariacearum* Diederich & M.S. Christ.

NOTES. – This species was reported in South America from Bolivia, Colombia, Ecuador and Peru (Diederich 1996, 2003; Etayo 2002, 2010a). In this paper the second Bolivian locality is presented. *Lobariella crenulata* (Hook. f.) Yoshim. is also a new host species.

Specimens examined. – **BOLIVIA. DEPT. LA PAZ:** PROV. NOR YUNGAS: Coroico village, 16°11'10"S, 67°43'16"W, 1550 m, Yungas montane forest, on thallus of *Lobariella crenulata*, *AF 16436, 16445.1 & PR* (KRAM, LPB, UGDA, herb. Flakus).

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Psora icterica (Lecanorales, Psoraceae), a new and interesting disjunction from Alabama

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ABSTRACT. – *Psora icterica* is reported new to Alabama growing on shallow sandy soil over granite flat rocks. This interesting disjunction further extends the range of this lichen species into the southeastern United States.

Psora icterica (Mont.) Müll. Arg. is a squamulose lichen easily recognized in the field by its rounded, concave to convex squamules with striking, bright yellow pigment (rhizocarpic acid) contrasted with dark red-brown to black, centrally located apothecia. For a full description of the species see Timdal (1986). While exploring large, granite flat rocks (fig. 1a) in north Auburn, Alabama (fig. 1b) our attention was drawn to a small yellow-green pigmented, squamulose lichen growing on thin sandy soil in shallow depressions over the granite surface (fig. 1c). Preliminary identification as *Psora icterica* was considered unlikely at first because Alabama is well out of range of the known distribution of this species. A careful reexamination of the specimen was undertaken and a duplicate sent to Larry St. Clair at Brigham Young University for verification. This is the first report of *P. icterica* in Alabama (Hansen 2003; Hansen & Dute 2005; Hansen & Lendemer 2008; Hansen et al. 2008) and extends the range of this species well into the southeastern United States east of the Mississippi River.

As originally demarcated by Timdal (1986), and later followed by Brodo et al. (2001), *Psora icterica* was not known in the United States east of a line extending south from southwestern Minnesota to Brownsville, Texas, roughly the 97th meridian. Worldwide it has been collected on soils in arid, open habitats from deserts to conifer forests in North and South America (Brodo et al. 2001, Timdal 2002). Its occurrence has been well documented in the southwestern deserts and Intermountain West of the United States and in Baja California, Mexico (Brodo et al. 2001; Timdal 1986, 2002; St. Clair 1999). Lendemer (2008) reported new records of *P. icterica* from the central United States (Arkansas, Kansas, Missouri and Oklahoma) and several disjunct populations from the eastern United States (Maryland, New Jersey and Pennsylvania). Recently, this species was also collected in Georgia, where it was found growing in shallow gravel pans in association with *Dermatocarpon luridum* (With.) J. R. Laundon and intertwined with *Placidium arboreum* (Schwein. *ex* Tuck.) Lendemer (S. Beeching, pers comm.).

This interesting range extension of *Psora icterica* into Alabama may not be entirely unexpected when considering the habitat in which it has otherwise been found in North America outside of its normal range. As discussed by Lendemer (2008), the eastern disjunct populations in Pennsylvania and Maryland were from unique serpentine barrens, known to support other disjunct lichen species and putative endemic vascular plants. At a microhabitat scale, these serpentine barrens may provide favorable arid microhabitats that create desert-like conditions in which *P. icterica* can grow. In like manner, granite flat rocks and outcrops found on the Piedmont Plateau, primarily from east Alabama through Georgia and into the Carolinas, also provide desert-like microhabitats that may be favorable for *P. icterica* to thrive. Like serpentine barrens, granite flat rocks are also home to a unique vascular plant flora including several

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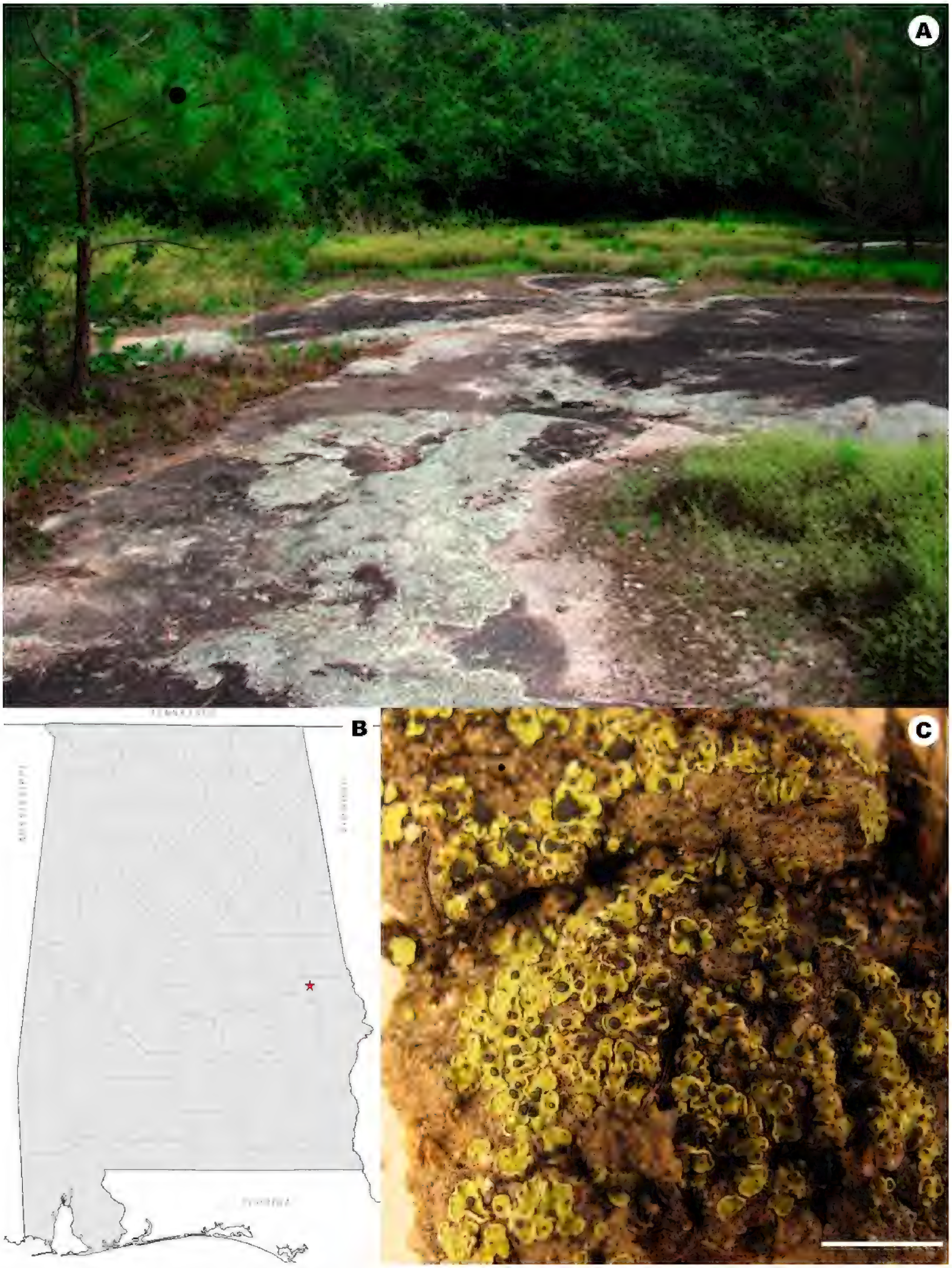

Figure 1, *Psora icterica* in Alabama (photos by the corresponding author). **A,** granite flat rock habitat of *Psora icterica* located in Auburn, Alabama. **B,** location of the collection site (red star) in Alabama. **C,** gross morphology of *Psora icterica* (*C.J. Hansen 5097*, scale = 5.0 mm).

uncommon endemics such as *Diamorpha smallii* Britt. *ex* Small, *Phemeranthus mengesii* (W. Wolf) Kiger, and *Amphianthus pusillus* Torr. While vast arid deserts characteristic of southwestern North America are not present in the eastern part of the continent, there are hundreds of desert-like microhabitats on rocky exposures, serpentine barrens, open rocky glades and elsewhere that may serve as habitable substrate for this enigmatic species. Additional searches for *P. icterica* in the arid microhabitats of the eastern United States will likely prove successful.

Specimens examined. – **U.S.A. ALABAMA.** LEE CO.: north of Lee County Road 72, north Auburn, 1 Jul 2011, on sandy soil over large exposed granite flat rock, *C.J. Hansen 5097* (AUA, BRY).

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We are grateful to Art Chappelka and Efrem Robbins for arranging access to the granite outcrop and to Larry St. Clair for confirming the identification of *Psora icterica*. In addition to his helpful review, we are grateful to Sean Beeching for permitting us to publish his report of *P. icterica* from Georgia. We thank Irwin Brodo for his constructive review and James Lendemer for his skillful editing. Ashley Peters is thanked for generating the map for figure 1b.

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New and Interesting Lichens from Kejimkujik National Park and National Historic Site, Nova Scotia, Canada

RICHARD TROY MCMULLIN[1]

ABSTRACT. – A lichen monitoring program was implemented at Kejimkujik in 2006. At that time, lichens were collected in plots that were established for the monitoring program. These collections were added to all known lichen collections in the park and a provisional lichen list was developed. The monitoring program at Kejimkujik requires an assessment every five years; therefore, the second round of monitoring occurred in 2011. To increase the statistical power of the initial monitoring program six new plots were added to the original six, which led to the discovery of additional lichen species. New records for lichen species previously unreported in the park were also made outside of the study plots. Fifty-three new species were indentified in 2011, which brings the total number of known lichen species in Kejimkujik to 238 in 103 genera. Two of the new lichens discovered are listed by the Committee on the Status of Endangered Wildlife in Canada as species at risk, *Erioderma mollissimum* (endangered) and *Degelia plumbea* (special concern). One of the new species discovered is provincially red-ranked (at risk in Nova Scotia), which brings the total number of provincially red-ranked species known in the park to two: *E. mollissimum* and *Xanthoparmelia mougeotii*. Three of the new species discovered are provincially yellow-ranked (sensitive to disturbance), which increases the known yellow-ranked species in the park to nine: *Anzia colpodes*, *Cladonia stygia*, *Leptogium corticola*, *L. milligranum*, *L. subtile*, *Physconia detersa*, *Sticta fuliginosa*, *Usnea cavernosa and U. mutabilis*.

INTRODUCTION

A provisional list of the lichen species occurring in Kejimkujik National Park and National Historic Site in Nova Scotia (Fig. 1) was recently created by the author (McMullin 2009). The list began with lichen species collected during the implementation of a lichen monitoring program at Kejimkujik in 2006 (McMullin & Ure 2008). The records from the monitoring plots were combined with all other known lichen collection records in the park to create the first provisional checklist. The lichen monitoring program includes an assessment of the lichen diversity in the study plots every five years. The second stage of monitoring was conducted in November of 2011. During the 2011 assessment, six new plots were added to the original six to increase the statistical power of the analyses that could be performed on the data collected (Fig. 2). In these additional plots, lichen species new to Kejimkujik were discovered. Outside of the study plots, records of lichen species previously unreported in the park were also discovered opportunistically (Figs. 2 and 3). The present study includes an update to the lichen checklist for Kejimkujik and identifies rare or interesting species in the park.

MATERIALS AND METHODS

A detailed description of the methods and sampling plots used in the lichen monitoring program at Kejimkujik is presented by McMullin and Ure (2008). All sampling plots were established in mature mixed-wood forests dominated by *Acer rubrum*, *Quercus rubra* and *Pinus strobus*. This forest type is common in Kejimkujik, it occurs on moderately well-drained, fine to medium textured till soils (Gimbarzevsky 1975).

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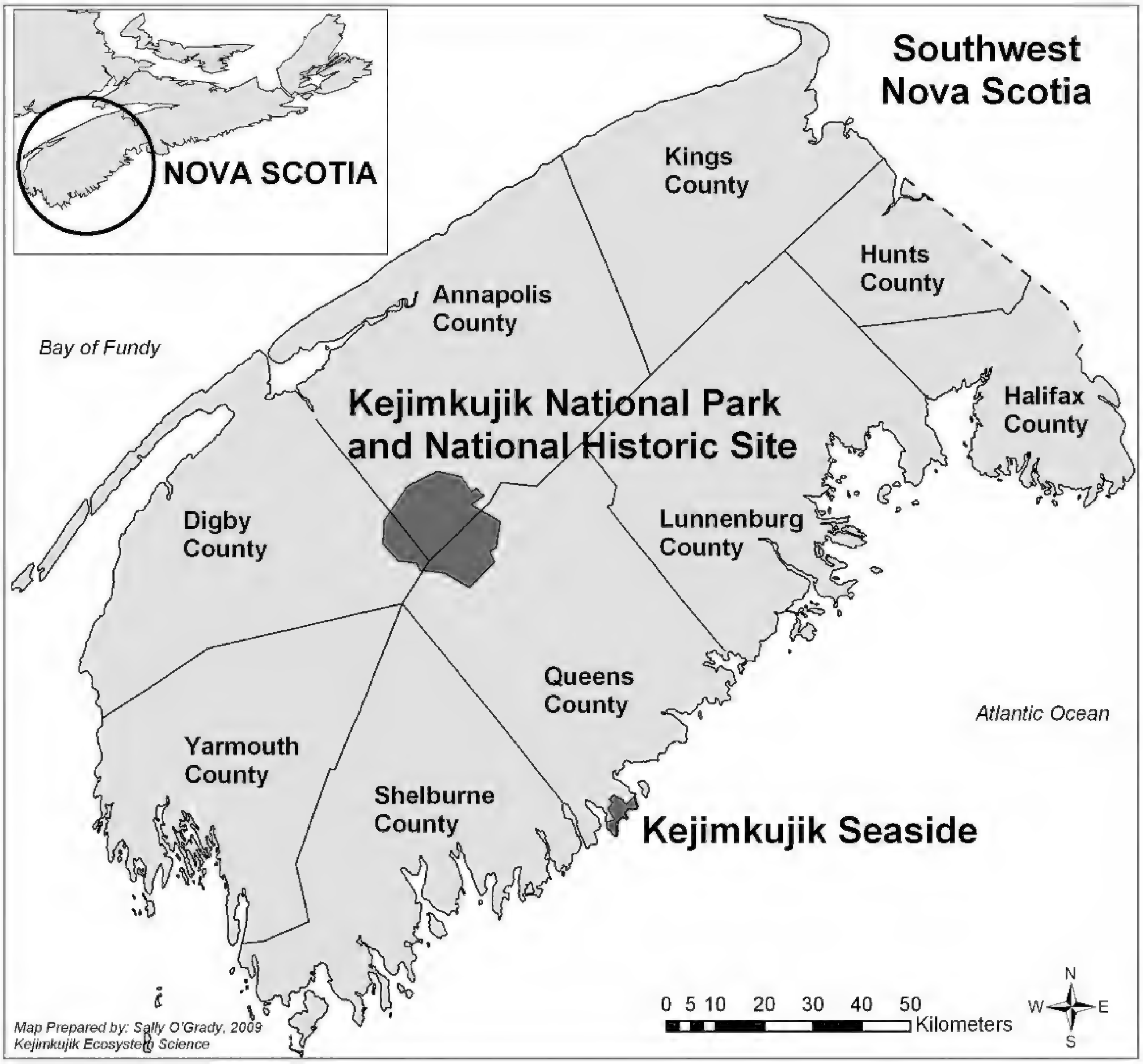

Figure 1. Kejimkujik's inland and coastal localities in Nova Scotia

Lichen specimens were identified using a stereo or compound microscope and chemical spot tests with para-phenylenediamine in ethyl alcohol, nitric acid, sodium hypochlorite, 10% potassium hydroxide, and Lugol's iodine (Brodo et al. 2001). Specimens that could not be reliably identified by morphology or spot tests were confirmed using thin-layer chromatography following Culberson and Kristinsson (1970) and Orange et al. (2001). Photographs were captured with a Canon PowerShot A2000IS digital camera. Voucher specimens are stored at Kejimkujik and the Biodiversity Institute of Ontario Herbarium (OAC) at the University of Guelph, Ontario.

RESULTS

The total number of park species newly discovered in 2011 was 53 in 33 genera. These records increase the total number of lichen and allied fungi species known from Kejimkujik to 238 in 103 genera. Five of the 53 newly discovered lichen species in Kejimkujik have a federal or provincial status rank as either a species at risk or a species sensitive to disturbance. Federally, two species new to the park are listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), *Erioderma mollissimum*, which is endangered (Cameron et al. 2009), and *Degelia plumbea*, which is a species of special concern (Richardson et al. 2010) (Fig. 4A-B). Provincially, one of the species newly discovered has been given a red-rank by the Nova Scotia Department of Natural Resources (NSDNR), which increases the number of provincially red-ranked lichens in the park to two: *E. mollissimum* and *Xanthoparmelia mougeotii*. Species

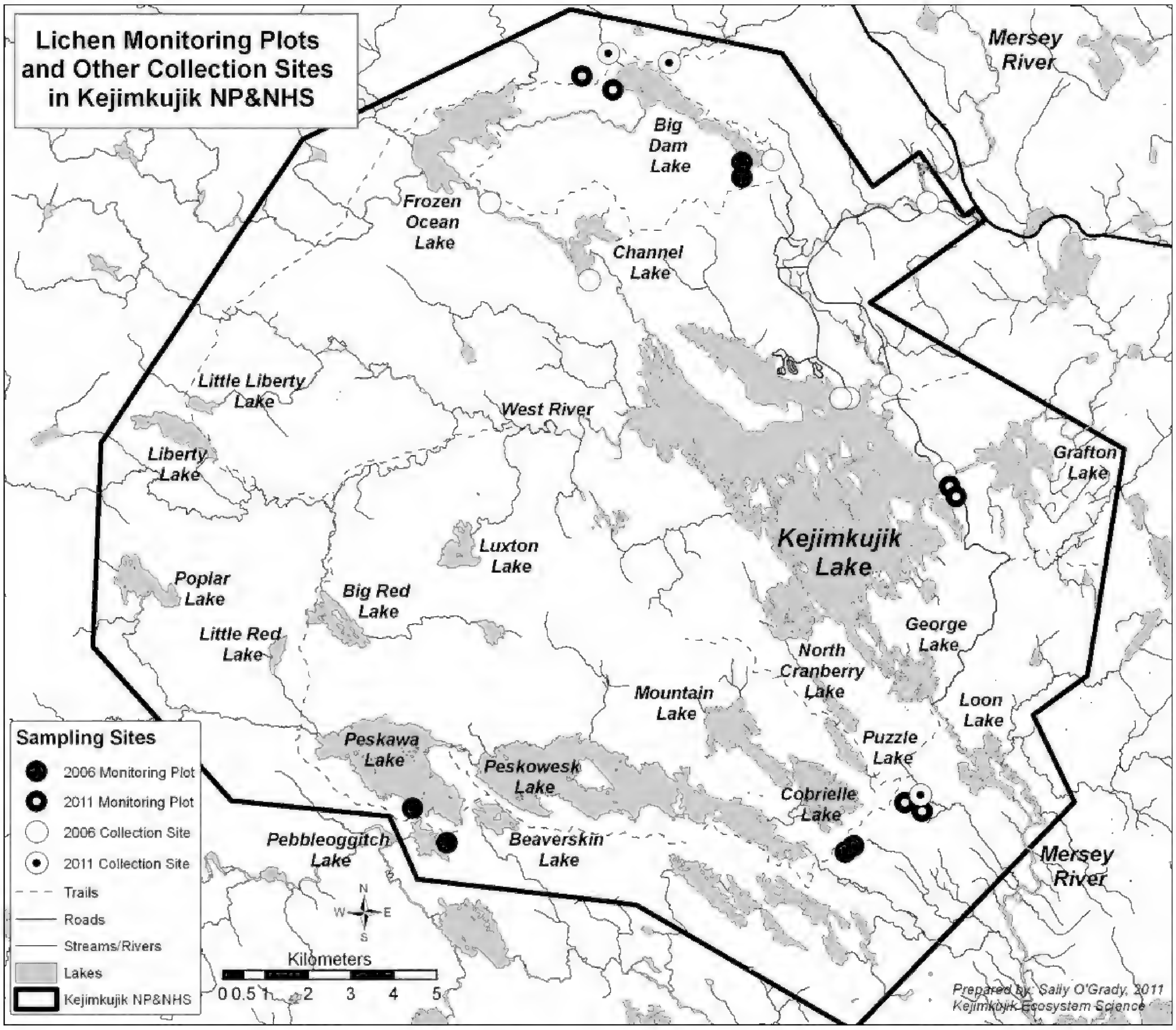

Figure 2. Location of the lichen collection sites in the inland portion of Kejimkujik National Park and National Historic Site.

designated as red-ranked in Nova Scotia are believed to be at risk of extinction or extirpation in the province (NSDNR 2009). Three of the newly discovered species have been given a yellow-rank by NSDNR (Fig 4C-E), which increases the number of yellow-ranked lichen species in park to nine: *Anzia colpodes*, *Cladonia stygia*, *Leptogium corticola*, *L. milligranum*, *L. subtile*, *Physconia detersa*, *Sticta fuliginosa*, *Usnea cavernosa and U. mutabilis*. A yellow-rank is given to species that are sensitive to human activities or natural events (NSDNR 2009).

CHECKLIST

The checklist below is arranged alphabetically by genus and species. Roman numerals following the author's collections correspond to the georeferenced localities in Appendix I. Collections preceded by an asterisk "*" were only found at Kejimkujik Seaside. Non-lichenized fungi treated with lichens are preceded by a dagger "†". Nomenclature follows Brummitt and Powell (1996) and the 17th edition of the North American Lichen Checklist (Esslinger 2011).

*_Alectoria sarmentosa_ (Ach.) Ach. ssp. _sarmentosa_ – _McMullin 7952_ (XX).
*_Arctoparmelia incurva_ (Pers.) Hale – _McMullin 7953_ (XXI).
Baeomyces rufus (Huds.) Rebent. – _McMullin 7954_ (XII).
Bryoria capillaris (Ach.) Brodo & D. Hawksw. – _McMullin 7950_ (XIX) and _7955_ (XII).

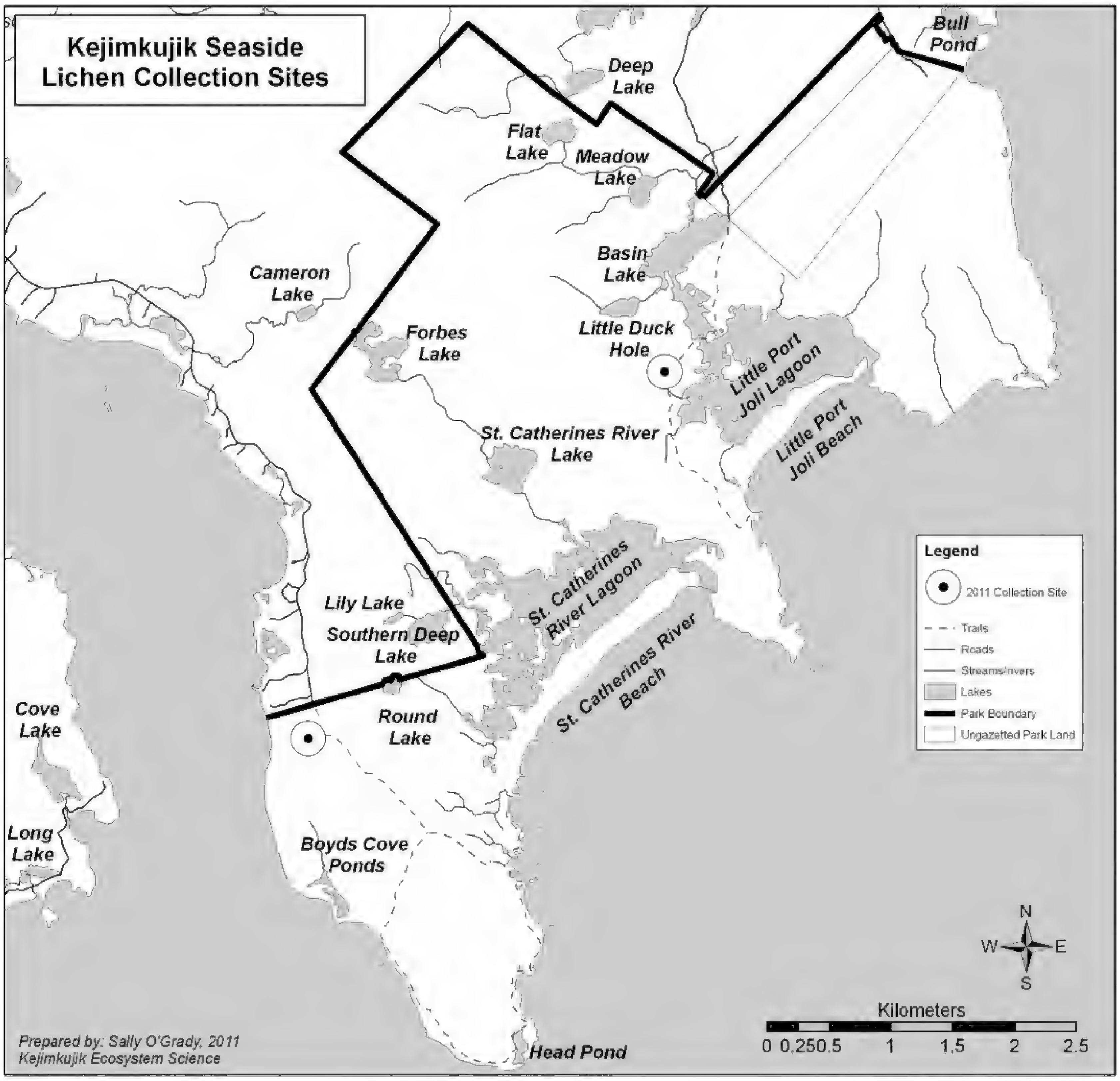

Figure 3. Location of the lichen collection sites in Kejimkujik Seaside.

Bryoria fuscescens (Gyeln.) Brodo & D. Hawksw. – *McMullin 7956* (XX) and *8035* (XII).
Bryoria nadvornikiana (Gyeln.) Brodo & D. Hawksw. – *McMullin 7957* (XVI).
Calicium abietinum Pers. – *McMullin 8004* (XX), *8010* (I) and *8111* (I).
Calicium lenticulare Ach. – *McMullin 7999* (XII), *8003* (I), *8013* (I) and *8016* (XX).
Calicium salicinum Pers. – *McMullin 8012* (I) and *8026* (V).
Chaenotheca chrysocephala (Ach.) Th. Fr. – *McMullin 7958* (XVIII) and *8015* (XX).
Chaenotheca ferruginea (Turner ex Sm.) Mig. – *McMullin 8131* (XX).
Chaenotheca xyloxena Nádv. – *McMullin 8008* (XV).
**Chrysothrix* sp. – *McMullin 7960* (XX).
**Cladonia boryi* Tuck. – *McMullin 8110* (XXI).
Cladonia merochlorophaea Asahina – *McMullin 7962* (VI).
Cladonia multiformis G. Merr. – *McMullin 7963* (XIV).
Cladonia parasitica (Hoffm.) Hoffm. – *McMullin 7964* (XVII).
Cladonia rei Schaer. – *McMullin 7965* (XVIII).
**Cladonia stygia* (Fr.) Ruoss – *McMullin 7966* (XX).
**Coccocarpia palmicola* (Spreng.) Arv. & D. J. Galloway – *McMullin 7967* (XX).
**Degelia plumbea* (Lightf.) P. M. Jørg. & P. James – *McMullin 7968* (XX).

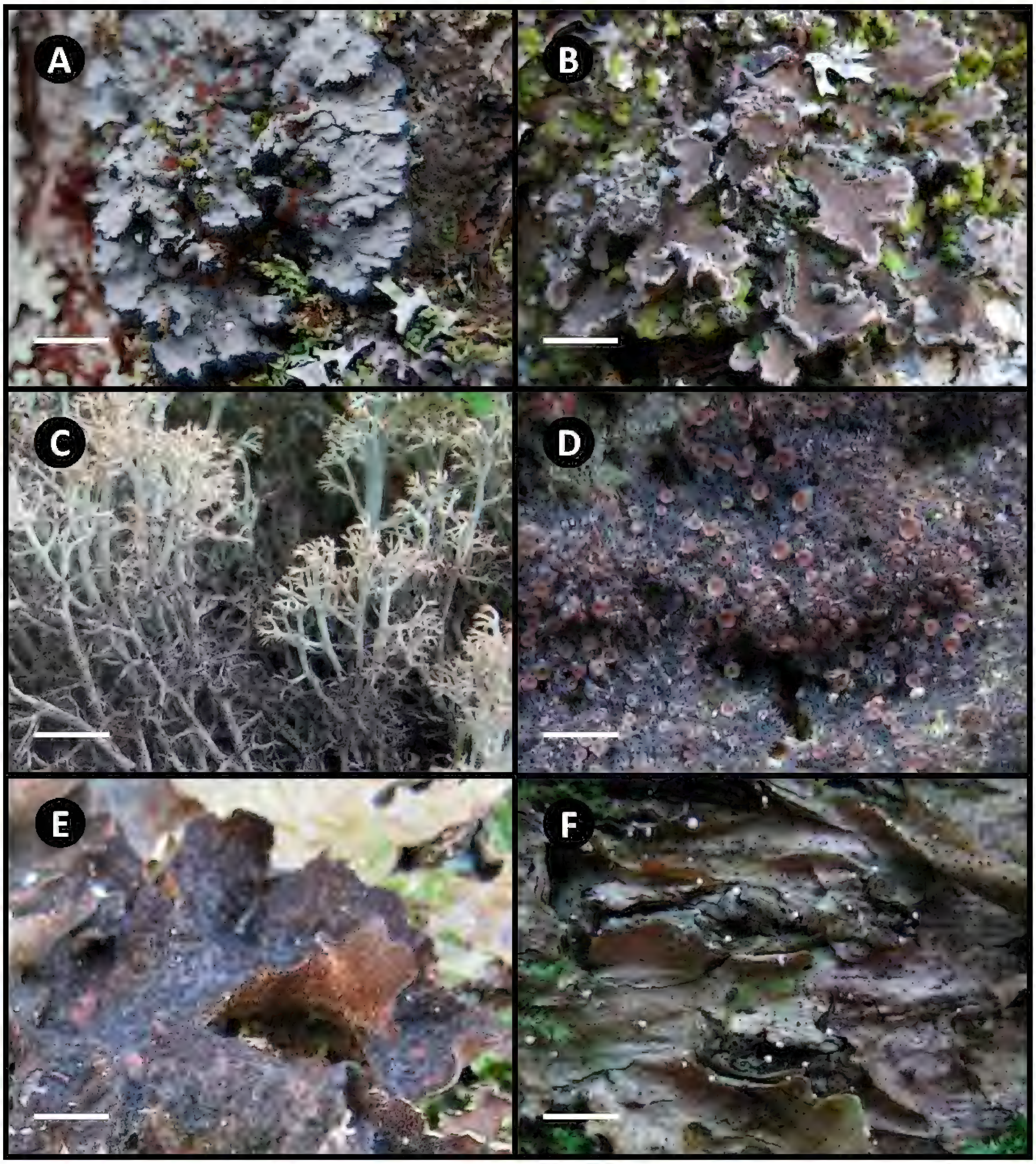

Figure 4. A-B, Federally (COSEWIC) listed species at risk discovered in Kejimkujik in 2011. **A,** *Degelia plumbea* (*McMullin 8210*, scale = 6.0 mm). **B,** *Erioderma mollissimum* (*McMullin 7971*, scale = 9.0 mm). **C-E,** Provincially yellow listed species discovered at Kejimkujik in 2011. **C.** *Cladonia stygia* (*McMullin 7665*, scale = 1.25 cm). **D.** *Leptogium subtile* (*McMullin 7977*, scale = 1.0 mm). **E.** *Sticta fuliginosa* (*McMullin 7996*, scale = 6.0 mm). **F.** *Dictyocatenulata alba* (*McMullin 7888*, scale = 1.25 mm).

Dictyocatenulata alba Finley & E. F. Morris – *McMullin 7970* (VI).
**Erioderma mollissimum* (Samp.) Du Rietz – *McMullin 7971* (XX) (photographed, not collected).
**Heterodermia neglecta* Lendemer, R.C. Harris & E. Tripp – *McMullin 7972* (XX).
**Hypogymnia krogiae* Ohlsson – *McMullin 7973* (XX).
**Hypogymnia vittata* (Ach.) Parrique – *McMullin 8136* (XX).
**Imshaugia aleurites* (Ach.) S.F. Mey. – *McMullin 7974* (XXI).
†*Julella fallaciosa* (Arnold) R.C. Harris – *McMullin 7975* (XII).
Lecania croatica (Zahlbr.) Kotlov – *McMullin 9012* (XVI).
Leptogium laceroides (B. de Lesd.) M. Jørg. – *McMullin 7976* (XIV), *8031* (XIV) and *8052* (XX).
Leptogium subtile (Schrad.) Torss. – *McMullin 7977* (XIII), *8028* (XIV) and *8056* (XV).
**Menegazzia subsimilis* (H. Magn.) R. Sant. – *McMullin 7978* (XX).
Menegazzia terebrata (Hoffm.) A. Massal. – *McMullin 7979* (XXII) and *8039* (XXII).
**Moelleropsis nebulosa* ssp. *frullaniae* Maas – *McMullin 7980* (XX).
Mycoblastus sanguinarioides Kantvilas – *McMullin 7981* (I).
†*Mycocalicium subtile* (Pers.) Szatala – *McMullin 7982* (XVIII), *8001* (XVI) and *8014* (XVII).
Nephroma helveticum Ach. – *McMullin 7983* (XXII).
**Nephroma laevigatum* Ach. – *McMullin 7984* (XX).
Nephroma parile (Ach.) Ach. – *McMullin 8129* (XIV).
Pannaria conoplea (Ach.) Bory – *McMullin 7986* (XV) and *8133* (XXII).
Pannaria rubiginosa (Ach.) Bory – *McMullin 8109* (XVIII) and *8137* (XX).
Parmotrema crinitum (Ach.) M. Choisy – *McMullin 7988* (XIV), *8111* (XXII) and *8124* (XX).
Peltigera leucophlebia (Nyl.) Gyeln. – *McMullin 7989* (XV).
Peltigera membranacea (Ach.) Nyl. – *McMullin 8036* (XXII).
Peltigera neopolydactyla (Gyeln.) Gyeln. – *McMullin 7991* (XV).
†*Phaeocalicium compressulum* (Nyl. ex Szatala) A.F.W. Schmidt – *McMullin 7992* (XX) and *8024* (XVIII).
†*Phaeocalicium polyporaeum* (Nyl.) Tibell – *McMullin 8023* (XVII)
Protopannaria pezizoides (Weber) M. Jørg. & S. Ekman – *McMullin 7995* (XX) and *8135* (XVI).
†*Stenocybe pullatula* (Ach.) Stein – *McMullin 7994* (XXII) and *8025* (XV).
Stereocaulon intermedium (Savicz) H.Magn. – *McMullin 7995* (XV).
**Sticta fuliginosa* (Hoffm.) Ach. – *McMullin 7996* (XX).
**Usnea cornuta* Körb. – *McMullin 7997* (XX).
Xanthoparmelia plittii (Gyelnk) Hale – *McMullin 7998* (XII).

DISCUSSION

The biodiversity in southwestern Nova Scotia is rich and unusual both provincially and nationally, which is a primary reason the area around and including Kejimkujik was designated the Southwest Nova Biosphere Reserve by the United Nations Educational, Scientific and Cultural Organization (UNESCO 2001). Kejimkujik alone contains at least 14 COSEWIC listed species in addition to the two listed lichens found in this study (Caverhill & Crowley 2008, COSEWIC 2012, Megan Crowley, pers. com. 2011). The lichen diversity in the park is also rich and unusual. For example, 29 of the 238 species currently known from Kejimkujik are cyanolichens, which comprise six of the 12 (50%) provincially and federally listed species at risk in the park.

Three of the species newly discovered in Kejimkujik that do not have a provincial or federal status rank are also of interest. The first is *Dictyocatenulata alba*, which is a new record for Nova Scotia (Fig. 4F). This species is, however, expected to be common throughout the province. *Dictyocatenulata alba* was likely over-looked in the past because it is relatively inconspicuous and it was only recently found to be lichenized (Lendemer and Harris 2004). It is a globally widespread species that is common in mature and humid broad-leaved and mixed-wood forests (Diederich et al. 2008). The second species of interest is *Mycoblastus sanguinarioides*. It was only recently reported from Nova Scotia by Spribille et al. (2011). They showed that specimens in this region that were previously identified as *M. sanguinarius* may be *M. sanguinarioides*, a species that has previously been known from the southern hemisphere. *Mycoblastus sanguinarius* lacks the birefringent crystals in the hymenium that are found in *M. sanguinarioides*. *Mycoblastus sanguinarioides* appears to be more common in the province based on a reassessment of the author's previous collections and consultation with local lichenologist Frances Anderson (pers com. 2011).

Neither species of *Mycoblastus* has previously been collected in Kejimkujik (McMullin 2009). The last species of interest is *Cladonia merochlorophaea*, which appears to be uncommon in Nova Scotia, based on an unpublished provincial lichen checklist maintained by Frances Anderson. *Cladonia merochlorophaea* is previously known from a single 1981 collection in Cape Breton, *Wetmore 43127* (MIN), but it is likely more common than collections suggest due to species in the *C. chlorophaea* group often being grouped together.

Five of the 12 (42%) lichens that are provincially or federally listed as species at risk in the park occur only at Kejimkujik Seaside. In addition, 17 of the 53 (32%) lichen species discovered in the present study and 33 of the 238 (14%) lichen species known from the park also occur only at Kejimkujik Seaside (McMullin 2009). Ecologically, Kejimkujik's two localities are different, belonging to different provincial ecoregions determined by NSDNR (Neily et al. 2003). Kejimkujik Seaside is in the Atlantic Coastal Ecoregion, while the inland portion of the park is in the Western Ecoregion, which accounts for the differences in the lichen communities. An uncommon forest ecosystem at Kejimkujik Seaside contained 15 lichen species that were not found anywhere else in the park, which includes both of the COSEWIC listed species at risk. This ecosystem is a mature, open canopy forest with high humidity and tree cover dominated by *Abies balsamea* and *Acer rubrum*.

Lichen collections in Kejimkujik have primarily been made opportunistically. A systematic investigation of the lichens in the park will undoubtedly reveal a greater number of species. Based on the number of rare and sensitive species discovered during this study, a closer examination of the lichens in Kejimkujik is recommended to better understand its rich and unusual lichen diversity.

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APPENDIX I – GEOREFERENCED LOCALITIES

The roman numerals below correspond to those following the collection numbers of the author in the checklist above. Coordinate data are given as UTMs, zone 20T, NAD83.

Lichen Monitoring Plots and Collection Sites at Kejimkujik

2006 Monitoring Plots

I:	312091	4908829	- Channel Lake Trail Monitoring Plot A
II:	312891	4908029	- Channel Lake Trail Monitoring Plot B
III:	319774	4923544	- Cobrielle Lake Monitoring Plot A
IV:	319774	4923894	- Cobrielle Lake Monitoring Plot B
V:	322186	4907810	- Peskawa Lake Monitoring Plot A
VI:	322386	4907960	- Peskawa Lake Monitoring Plot B

2006 Collection Sites

VII:	313890	4922955	- Along Portage U, between Frozen Ocean Lake and Channel Lake
VIII:	316210	4921150	- Backcountry Camp Site # 9, at the south end of Channel Lake
IX:	322263	4918393	- Jim Charles Campground, site 1
X:	322075	4918388	- Jim Charles Campground, site 2
XI:	324100	4922950	- Visitor Center, forest trail along the river
XII:	324492	4916660	- Grafton Lake, forested area along the river, near the bridge
XIII:	323238	4918703	- Jakes Landing, road side
XIV:	320495	4923944	- Big Dam Lake, on the trail near the turn off for Hemlocks & Hardwoods Trail

2011 Monitoring Plots

XII:	316770	4925580	- Still Brook Monitoring Plot A
XIII:	316040	4925900	- Still Brook Monitoring Plot B
XIV:	324621	4916338	- Grafton Lake Monitoring Plot A
XV:	324780	4916101	- Grafton Lake Monitoring Plot B
XVI:	323586	4908960	- Square Camp Brook Monitoring Plot A
XVII:	323986	4908760	- Square Camp Brook Monitoring Plot B

2011 Collection Sites

XVIII:	316659	4926434	- Frozen Ocean Trail, at unnamed brook
XIX:	318083	4926220	- Frozen Ocean Trail, at the bridge over Thomas Meadow Brook
XX:	353583	4858406	- Kejimkujik Sea Side, treed wetland on the east side
XXI:	350700	4855446	- Kejimkujik Sea Side, coastal barrens on the west side
XXII:	323946	4909143	- Square Camp Brook

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Endemism lost: *Lecanora pallidochlorina* (Lecanorales, Lichenized Ascomycotina) in the Great Plains, U.S.A.

DOUGLAS LADD[1] & CALEB MORSE[2]

ABSTRACT. – *Lecanora pallidochlorina*, formerly known only from the Sonoran region of Mexico, is reported new to the United States from several localities in or bordering the Cross Timbers of the Great Plains, where it occurs on sheltered siliceous rocks that are protected from direct wetting.

INTRODUCTION

Formally described in Lumbsch et al. (2003), *Lecanora pallidochlorina* T.H. Nash, B.D. Ryan and Lumbsch is characterized by a thick, yellowish green, granulose sorediate crustose thallus which frequently has abundant bluish white zeorin crystals imparting a pruinose appearance, tan, pruinose apothecia with thick thalline margins, small, broadly ellipsoid ascospores less than 14 µm long, and usnic acid and zeorin as major secondary metabolites, often with trace amounts of atranorin and fatty acids.

The species was previously thought to be restricted to exposed siliceous rocks in Mexican thorn forests at altitudes below 1000 meters. Ryan et al. (2004) characterize *Lecanora pallidochlorina* as endemic to southwestern North America, with world distribution confined to a few sites in the Sonoran region in the Mexican states of Baja California Sur, Sinaloa, and Sonora.

In our field work on lichens of the Great Plains, we have found *Lecanora pallidochlorina* at scattered sites in the Cross Timbers and adjacent prairie ecoregions of south-central United States. Here *L. pallidochlorina* appears to be restricted to dry, lightly shaded expanses of massive sandstone and granite under overhangs of outcrops, bluffs, and large boulders, growing in sheltered areas protected from direct wetting, but with moderately high light intensity. The majority of Great Plains populations occur in wooded environments, although the northernmost population was found on sandstone outcrops in an upland mixed-grass prairie in central Kansas. *Dirinaria frostii, Lepraria* spp., and *Tephromela atra* are frequent associates in most habitats. (Although *T. atra* is a common corticolous taxon in the coastal plain of southeastern North America, it is uncommon further north in the Great Plains and Interior Highlands, where it occurs almost exclusively on massive siliceous substrates.)

With the exception of the range disjunction and specialized sheltered habitat, Great Plains material seems largely congruent with Sonoran material examined. Lumbsch et al. (2003) cite a total of seven specimens including the type; we have examined three of these and find them to generally correspond well with our material. A detailed description based on Great Plains material follows, since we have noted some details and variation not discussed in the original species description.

DESCRIPTION OF *LECANORA PALLIDOCHLORINA*

Thallus pale yellowish green to glaucous green, initially of small corticate, occasionally subcoralloid areoles typically 0.2-0.3 mm broad, these becoming granulose-sorediate and the entire thallus typically becoming a continuous crust of coarse granulose soredia; older portions of thallus becoming thickened and rimose, often densely beset with zeorin crystals; prothallus occasionally present, localized,

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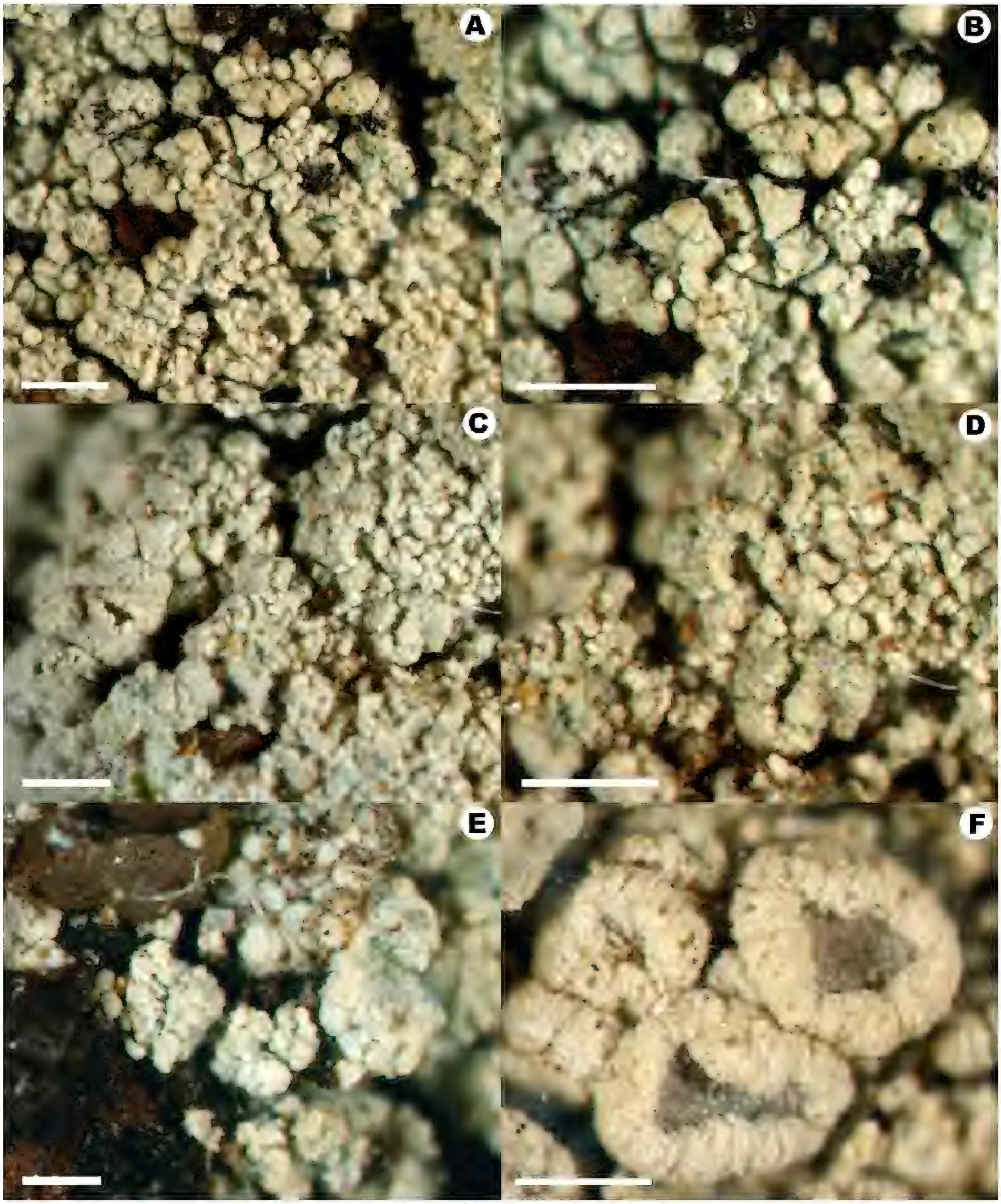
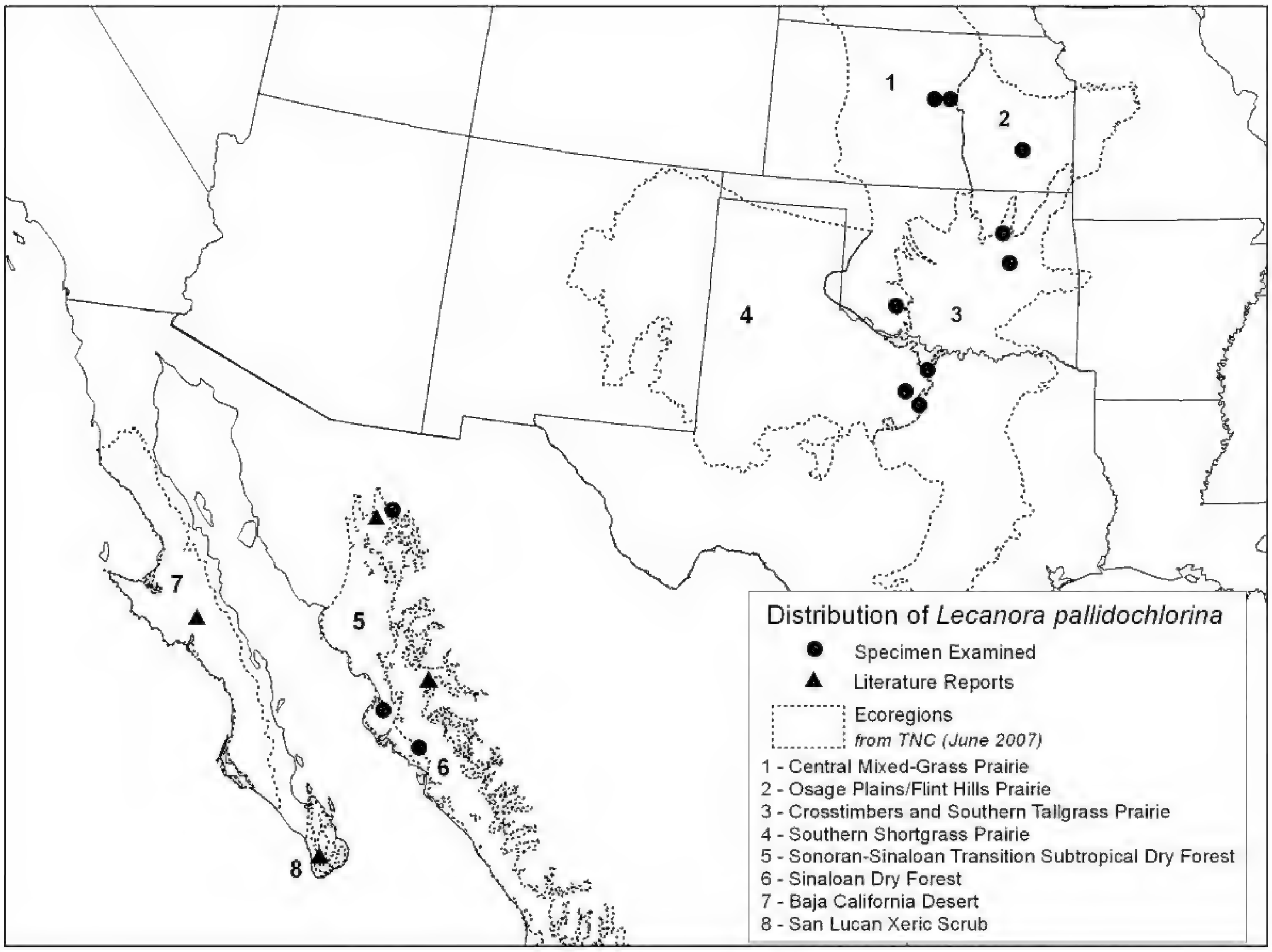


Figure 1, *Lecanora pallidochlorina* (all from *Morse 12645*). A-E, marginal portions of the thallus where the disintegration of areoles into coarse granulose soredia is most apparent. F, apothecia. Scales = 0.5 mm: A-D and F; 0.25 mm: E.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Distribution of *Lecanora pallidochlorina*
● Specimen Examined
▲ Literature Reports
Ecoregions
from TNC (June 2007)
1 - Central Mixed-Grass Prairie
2 - Osage Plains/Flint Hills Prairie
3 - Crosstimbers and Southern Tallgrass Prairie
4 - Southern Shortgrass Prairie
5 - Sonoran-Sinaloan Transition Subtropical Dry Forest
6 - Sinaloan Dry Forest
7 - Baja California Desert
8 - San Lucan Xeric Scrub

Figure 2, geographic distribution *Lecanora pallidochlorina* as presently known.

white, poorly differentiated and somewhat fibrous, or rarely narrow and black. **Apothecia** lecanorine, occasional and scattered, sessile, +/- plane, to ca. 1(1.8) mm broad, disks pale tan, in age becoming locally to wholly purplish brown, usually with a thin white pruina; margin to 0.3 mm thick, granulose-sorediate, lacking an obvious cortex, typically with coarse irregular crenations, raised above the disk and when well developed, sometimes appearing obscurely radially ridged or striate; **epihymenium** brown, granulose, ca. 10 µm thick, KOH-, granules dissolving in KOH; **amphithecium** ca. 150-190 µm thick, with abundant algae throughout, with frequent large irregular crystals to ca. 20 µm on their longest axis, these persistent in KOH; **paraphyses** distinct, frequently branched in distal portions, not notably expanded at apices, which are typically to 3 µm broad; **subhymenium** pale yellowish in KOH; **ascospores** 8, simple, hyaline, broadly elliptical, (7.5) 8.6-10.2-11.8 (13.4) × (4.6) 4.9-5.7-6.5 (7.6) µm [n=48]. **Chemistry**: thallus KOH+ yellow, KC-, C-, UV-; all Great Plains material contains usnic acid and zeorin, but no atranorin was detected by TLC. Both specimens from Ellsworth Co., Kansas contain a fatty acid with R_f values just above zeorin in solvent systems A, B', and C of Orange (2001).

Great Plains specimens examined. - **U.S.A. KANSAS.** ELLSWORTH CO.: near Carneiro, Wildlife Management Area, 31.iii.2006, *C.A. Morse 12645* (KANU), 27.x.2007, *C.A. Morse 16137 & K. Logan* (KANU). WOODSON CO.: Woodson Co. State Fishing Lake and Wildlife Area, 28.ix.2008, *C.A. Morse 18051 & K. Logan* (KANU), *C.A. Morse 18053 & K. Logan* (KANU). **OKLAHOMA.** COMANCHE CO.: Wichita Mountains Wildlife Refuge, 14-15.iv.2010, *C.A. Morse 20456* (KANU). OKMULGEE CO.: Okmulgee State Park, 6.ix.2009, *C.A. Morse 20194 & K. Logan* (KANU; duplicates to be distributed with *Lich. Exs. Magnicamporum*). OSAGE CO.: Keystone Ancient Forest Preserve, 1.v.2009, *C.A. Morse 18865 & D. Ladd* (KANU). **TEXAS.** JACK CO.: Bruck tract, ca. 6.5 mi. S, 2 mi. E of Bryson, 28.iv.2009, *C.A. Morse 18619 & D. Ladd* (KANU). MONTAGUE CO.: Fossil Hill, ca. 6.3 mi. W/NW of Sunset, 28.iv.2009, *D. Ladd 30701 & C.A. Morse* (KANU; HB. LADD). PARKER CO.: Lake Mineral Wells State Park, 27.iv.2008, *C.A. Morse 18528 & D. Ladd* (KANU).

Other specimens examined (all confirmed by H.T. Lumbsch, 2002). – **MEXICO. SINALOA**: 52 km SE of Guasave, 27.xi.1975, *T.H. Nash III 12230* (ASU-516044); 38 km N of Los Mochis, 1.ii.1993, *T H. Nash III 33667* (ASU-516371). **SONORA**: 14 km ENE of Moctezuma, 9.ii.1993, *J. Marsh 5914* (ASU-516801).

BIOGEOGRAPHIC IMPLICATIONS

The Cross Timbers ecoregion of south-central North America (Figure 2) is poorly studied from a biological perspective. The Cross Timbers contain some of the last remaining expanses of old-growth oak woodlands in North America (Clark et al. 2004) and are surrounded by extensive grasslands. This area, occurring along the western edge of the tallgrass prairie biome, is characterized by rocky, shallowly dissected topography typically developed in sandstone bedrock, with extensive areas of small, stunted timbers dominated by oaks (*Quercus* spp. — notably *Q. marilandica* and *Q. stellata*), with other hardwoods such as black hickory (*Carya texana*) and winged elm (*Ulmus alata*) (Francaviglia 2000, Hoagland et al. 1999). Woodland habitats in this region have strong vegetational affinities to the surrounding grassland biomes.

It is not known whether the Great Plains populations of *Lecanora pallidochlorina* represent a significant disjunction, or whether the apparent disjunction from Sonoran populations is an artifact reflecting the paucity of lichen work in the Great Plains, and a more continuous distribution will eventually be revealed. The Cross Timbers populations may be relics from the hypsithermal interval prevailing 9000-5000 years before present, when the regional climate was characterized by a warmer, drier regime more evocative of the modern Sonoran climate. The restriction to sites protected from direct wetting in the Cross Timbers, but not in Sonoran populations, may reflect increased susceptibility to fungal infestation in the higher moisture regimes of the Cross Timbers and prairies.

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A Checklist of the Lichenicolous Biota of California

JANA KOCOURKOVÁ [1], KERRY KNUDSEN[2] AND SHIRLEY TUCKER[3]

ABSTRACT. – One hundred and eighty-seven lichenicolous fungi and lichenicolous lichens are reported from California. *Abrothallus acetabuli* and *Intralichen lichenicola* are reported new for North America and California. *Sclerococcum montagnei* is reported new for California. A strict definition of lichenicolous lichens as non-lichenized juvenile parasites that develop an independent lichenized thallus is used and 19 species are reported for California.

KEYWORDS. - Biodiversity, floristics, parasites.

INTRODUCTION

This checklist summarizes the current literature on lichenicolous fungi and lichenicolous lichens occurring in California, U.S.A. as well as our own completed research in the state prior to 2011. One hundred and eighty-seven lichenicolous fungi and lichenicolous lichens are reported from California: 168 lichenicolous fungi and 19 lichenicolous lichens (see materials and methods for definition). This contribution establishes a baseline of reported diversity. Our unpublished data indicate that the actual diversity of the lichenicolous biota is much higher than current estimates and that many more discoveries are to be expected. Due to the small number of collections, and collectors, of lichenicolous fungi in North America, we have no clear idea of the distribution of any of these species in California or the continent as a whole.

MATERIALS AND METHODS

The checklist is based on the vouchers deposited at ASU, NY, PRM, SBBG, UCR, YOSM, and the Herbarium Mycologicum J. Kocourková & K. Knudsen in Prague (hb. myco. J.K & K.K) as well as reports and determinations in the literature by recognized experts such as P. Diederich, J. Hafellner, D.L. Hawksworth, J. Etayo, D. Triebel, and L. Tibell, even in a few cases where the actual specimen is not documented. More detailed information for many collections cited can be accessed at the UCR Herbarium website http://sanders5.ucr.edu/lichensflat_index.php, the website of New York Botanical Garden http://sciweb.nybg.org/science2/VirtualHerbarium.asp and on the website of the Consortium of North American Lichen Herbaria (CNALH) http://symbiota.org/nalichens. It should be noted that the specimen notes for UCR specimens cannot be viewed on the CNALH website. Current higher level classifications of genera can be found on http://www.lichenicolous.net and are still in flux for many taxa.

Lichenicolous lichens are defined here as those taxa which are juvenile non-lichenized parasites on lichenized fungi which ultimately emerge (morph) out the thallus of the host, forming an independent lichenized thallus (Fig. 1). Some taxa, such as *Rimularia insularis* (Nyl.) Rambold & Hertel or *Diploschistes muscorum* (Scop.) R. Sant., are obligate on specific species or genera. Other taxa, such as

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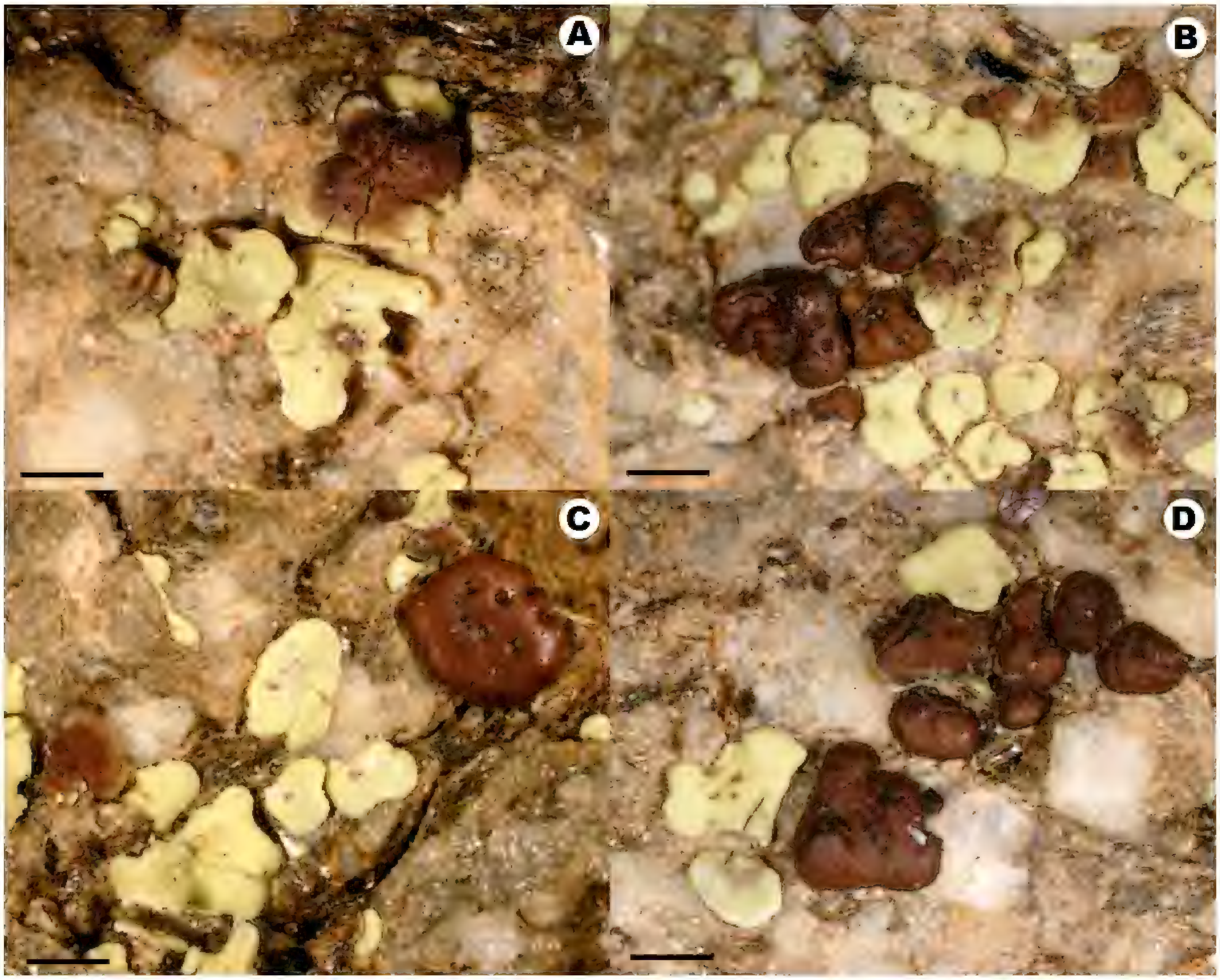

Figure 1, Series of images documenting the process of *Verrucaria compacta* morphing out of a thallus of *Acarospora socialis* (all from *Knudsen 4811*, NY; scales = 1.0 mm). A, areole of *A. socialis* beginning to morph. B, several morphed areoles of *V. compacta* adjacent to another in the early stages of the process. C-D, fully morphed areoles of *V. compacta*.

Buellia badia (Fr.) A. Massal., occur on a wide range of hosts. Some taxa such as *Verrucaria compacta* (A. Massal.) Jatta are apparently not obligatory juvenile parasites, but opportunistic, and only rarely are found morphing out of other lichens. Using this strict definition of lichenicolous lichens, 19 such species are reported for California.

For each species a reference is given for a description of the lichenicolous fungus or lichenicolous lichen treated. These references were chosen for use by North Americans from the easiest sources to obtain, especially the *Lichen Flora of the Greater Sonoran Desert Region*. Many of the references cited, such as the important paper by Diederich (2003) can be found online by checking Recent Literature in Lichens at http://www.nhm.uio.no/botanisk/lav/RLL/RLL.HTM.

CHECKLIST

1. *Abrothallus acetabuli* Diederich

NOTES. – The species was described from *Pleurosticta acetabulum* (Neck.) Elix & Lumbsch (Parmeliaceae) in Europe (Diederich 1990). Diederich later identified the California specimen but never formally reported it. The species is new to California and North America on a new host, *Parmelina coleae* Argüello and A. Crespo.

Representative specimen. – **U.S.A. CALIFORNIA**. SAN LUIS OBISPO CO.: Santa Margarita Lake Recreation Area, E of San Luis Obispo, 28.xii.1996, on *Parmelina coleae, S.C. Tucker 35126* (SBBG, det. Diederich).

2. *Abrothallus caerulescens* Kotte

NOTES. – Two species of *Abrothallus* are reported on *Xanthoparmelia* species in California. A specimen of *A. caerulescens* was reported by Diederich (2003) from San Benito County near Soledad. For a description see Diederich (2004a).

3. *Abrothallus microspermus* Tul.

NOTES. – The type host of this taxon is *Flavoparmelia caperata* (L.) Hale. The fungus often occurs in the pycnidial stage only which has been referred to as *Vouauxiomyces truncatus* (B. de Lesd.) Dyko and D. Hawksw. For a description see Diederich (2004a).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN CRUZ CO.: Santa Cruz, W edge of La Veaga Park, 13.iii.2002, on *Flavoparmelia caperata*, *S.C. Tucker 37640* (SBBG, det. Diederich).

4. *Abrothallus parmeliarum* (Sommerf.) Arnold

NOTES. – *Abrothallus parmeliarum* occurs on species of *Parmelia* s. str. It was reported from California on *P. saxatilis* (L.) Ach. by Triebel et al. (1991). Originally it was reported for California from *P. saxatalis* in the San Gabriel Mountains by Hasse (1915). Hasse also reported *A. parmeliarum* on *Melanohalea exasperatula* (Nyl.) O. Blanco et al. from Eden Hot Springs (Riverside County). However, that host is not known to occur in southern California. Hasse's report probably represents a different species of *Abrothallus* occurring on *Melanohalea elegantula* (Zahlbr.) O. Blanco et. al. or a brown *Xanthoparmelia*. The specimens documenting Hasse's reports were not seen by us. For a description see Diederich (2004a).

Representative specimen. – **U.S.A. CALIFORNIA**. MARIN CO.: Mt. Tamalpais State Park, 29.i.2006, on *Parmelia saxatilis*, *J.C. Lendemer 5832* (UCR).

5. *Abrothallus prodiens* (Harm.) Diederich & Hafellner

NOTES. – *Abrothallus prodiens* occurs on *Hypogymnia* and *Cavernularia* species. For a description see Diederich (2004a).

Representative specimens. – **U.S.A. CALIFORNIA.** MENDOCINO CO.: Pigmy Forest, 13.viii.1988, on *Cavernularia* species, *T.H. Nash 25492-B* (ASU, det. Triebel). SAN LUIS OBISPO CO.: Los Osos, 28.xii.1996, on *Hypogymnia* species, *S.C. Tucker 35088-A* (SBBG, det. Diederich).

6. *Abrothallus suecicus* (Kirschst.) Nordin

NOTES. – *Abrothallus suecicus* occurs usually on the apothecia of *Ramalina* species. For a description see Diederich (2004a).

Representative specimen. – **U.S.A. CALIFORNIA.** MONTEREY CO.: Hastings Natural History Reservation, 20.i.1996, on apothecia of *Ramalina menziesii*, *S.C. Tucker 34509-A* (SBBG, det. Diederich).

7. *Abrothallus tulasnei* M.S. Cole & D. Hawksw.

NOTES. – *Abrothallus tulasnei* occurs on *Xanthoparmelia* species. For a description see Cole and Hawksworth (2001).

Representative specimen. – **U.S.A. CALIFORNIA**. LOS ANGELES CO.: Santa Monica Mountains, 14.viii.2009, on *Xanthoparmelia* species, *J. Kocourková 7325 & K. Knudsen* (PRM-915681).

8. *Abrothallus usneae* Rabenh.

NOTES. – *Abrothallus usneae* occurs on *Usnea* species. Diederich (2003) reported a collection from Mendocino County. For a description see Diederich (2004a).

Representative specimen. – **U.S.A. CALIFORNIA**. SONOMA CO.: Sugar Loaf Ridge State Park, 30.vi.2002, on *Usnea arizonica*, *S.C. Tucker 37794* (SBBG, det. Diederich); Clear Lake State Park, 1.i.1992, on *Usnea fulvoreagens*, *S.C. Tucker 31706-A* (SBBG, det. Diederich).

9. *Abrothallus welwitschii* Mont. ex Tul.

NOTES. – *Abrothallus welwitschii* occurs on thallus of *Sticta* species. For notes on the discovery of this taxon see McGee (2003). For a description see Diederich (2004a).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN MATEO CO.: Santa Cruz Mountains, San Bruno, on *Sticta* species, *M. McGee s.n.* (SBBG, det. Diederich).

10. *Acaroconium punctiforme* Kocourk. & D. Hawksw.

NOTES. – This anamorphic fungus occurs on the thallus of members of the family Acarosporaceae. It is known from *Sarcogyne regularis* Körb. and *Acarospora macrospora* A. Massal. ex Bagl. in Europe (for information on authority of *A. macrospora* see Arcadia and Knudsen (2012)). In Southern California it was collected on *A. robiniae* K. Knudsen, which is endemic to the south and central coast of the California Floristic Province. For a description and illustrations see Kocourková and Hawksworth (2008).

Representative specimen. – **U.S.A. CALIFORNIA**. RIVERSIDE CO.: Santa Ana Mountains, Santa Rosa Plateau, 11.xii.2006, on *Acarospora robiniae*, *K. Knudsen 7973* (PRM-857257, UCR, hb. Etayo).

11. *Acarospora stapfiana* (Müll. Arg.) Hue

NOTES. – *Acarospora stapfiana* is a juvenile parasite on *Caloplaca trachyphylla* (Tuck.) Zahlbr. developing an independent thallus. It is frequent in the Great Basin lichen biota. It was reported new for California from the Clark Mountains in the Mojave Desert near the Nevada border (Knudsen & Kocourková 2010e). For a description see Knudsen (2007).

Representative specimens. – **U.S.A. CALIFORNIA**. SAN BERNARDINO CO.: Mojave National Preserve, Clark Mountains, 11.x.2009, on *Caloplaca trachyphylla* on limestone, *K. Knudsen 11764 & N. Pietrasiak* (UCR), *K. Knudsen 11765 & N. Pietrasiak* (UCR), *K. Knudsen 11766 & N. Pietrasiak* (UCR).

12. *Arthonia clemens* (Tul.) Th. Fr.

NOTES. – *Arthonia clemens* grows on the apothecia of *Rhizoplaca*. It is currently only known from Joshua Tree National Park in California (Diederich 2003). For a description see Grube (2007).

Representative specimen. – **U.S.A. CALIFORNIA**. SAN BERNARDINO CO.: Joshua Tree National Park, ridge east of Long Canyon, 4.x.2011, on *Rhizoplaca chrysoleuca*, *K. Knudsen 13706 & M. Harding* (UCR).

13. *Arthonia diploiciae* Calat. & Diederich

NOTES. – *Arthonia diploiciae* is restricted to *Diploicia canescens* (Dicks.) A. Massal. It is frequent on Anacapa Island in Channel Islands National Park (Knudsen 2009, Knudsen & Kocourková 2010a, Lendemer et al. 2009a). For a description see Grube (2007).

Representative specimens. – **U.S.A. CALIFORNIA**. VENTURA CO.: Channel Islands National Park, East Anacapa Island, 30.xi.2008, on *Diploicia canescens*, *K. Knudsen 10753* (UCR); West Anacapa Island, 19.xi.2008, on *D. canescens*, *J. Kocourková & K. Knudsen s.n.* (PRM-915316).

14. *Arthonia epiphyscia* Nyl.

NOTES. – *Arthonia epiphyscia* grows on the thallus of various *Physcia* species. Currently it is only known from San Diego (Kocourková et al. 2009). For a description see Grube (2007).

Representative specimen. – **U.S.A. CALIFORNIA**. SAN DIEGO CO.: San Diego, Mission Trails Regional Park, 1.v.2009, on *Physcia adscendens*, *K. Knudsen 10970* (UCR).

15. *Arthonia excentrica* Th. Fr.

NOTES. – *Arthonia excentrica* occurs on *Lepraria* and *Leprocaulon* species. Known from California on *Lepraria neglecta* s. lato. collected in Yosemite National Park (Lendemer et. al. 2010). For original description see Alstrup and Hawksworth (1990). See Lendemer et al. (2010) for how the California specimen varied from previous descriptions as well as for images.

Representative specimen. – **U.S.A. CALIFORNIA**. TUOLUMNE CO.: Yosemite National Park, Mammoth, 21.ix.2009, on *Lepraria neglecta* s. lato. [host reidentified by Lendemer, pers. comm.], *J.C. Lendemer 19690* (NY), *J.C. Lendemer 19692* (NY).

16. *Arthonia farinacea* (H. Olivier) R. Sant.

NOTES. – *Arthonia farinacea* occurs on the soredia of sorediate *Ramalina* species. For additional reports from California see Diederich (2003). For a description see Grube (2007).

Selected representative specimens. – **U.S.A. CALIFORNIA.** SAN LUIS OBISPO CO.: San Simeon State Park, 17.iv.1999, on soralia of *Ramalina*, *S.C. Tucker 36515* (SBBG), 10.v.2010, on soralia of *Ramalina*, *K. Knudsen 12111* (UCR).

17. ***Arthonia infectans*** **Egea & Torrente**

NOTES. – *Arthonia infectans* is a lichenized *Arthonia* which begins as a juvenile parasite on *Lecanographa hypothallina* (Zahlbr.) Egea and Torrente and *Sparria cerebriforme* (Egea and Torrente) Ertz and Tehler (Egea & Torrente 1995; Knudsen & Kocourková 2009a). The type is from Monterey County (Egea & Torrente 1995). It is a rare species, endemic to California, and is currently known from only three populations (Knudsen & Kocourková 2009a). For a description see Grube (2007).

Representative specimens. – **U.S.A. CALIFORNIA**. LOS ANGELES CO.: Malibu, Point Dume, 1.vi.2009, on *Sparria cerebriforme, K. Knudsen 11215 & T. Sagar* (NY, UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 20.vii.2007, on *Lecanographa hypothallina*, *K. Knudsen et al. 8721* (UCR).

18. ***Arthonia intexta*** **Almq.**

NOTES. – *Arthonia intexta* occurs in the apothecia of *Lecidella* species. Hertel (1969) cited a specimen from California collected in 1897 by H.E. Hasse (*H.E. Hasse s.n.*, H-NYL-19986[n.v.]). For description see Grube (2007).

Representative specimen. – **U.S.A. CALIFORNIA**. INYO CO.: near Westgard Pass, 18.viii.1973, on *Lecidella* species, *T.H. Nash 8086* (ASU).

19. ***Arthonia molendoi*** **(Heufl. ex Frauenf.) R. Sant.**

NOTES. – *Arthonia molendoi* occurs on the apothecia of *Xanthoria elegans* (Link) Th. Fr. and *Caloplaca* species. It is probably frequent in California. See Grube (2007) for a description.

Representative specimens. – **U.S.A. CALIFORNIA**. RIVERSIDE CO.: San Jacinto Mountains, East Canyon, 28.ix.2009, on *Xanthoria elegans*, *K. Knudsen 11708.1 & M. Schultz* (UCR). SAN BERNARDINO CO.: Joshua Tree National Park, Little San Bernardino Mountains, Eureka Peak, 9.iv.2006, on *X. elegans, K. Knudsen 5748.2* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 21.vii.2007, on *Caloplaca coralloides*, *J. Kocourková & K. Knudsen s.n.* (PRM-909650). VENTURA CO.: San Nicolas Island, 26.v.1992, on *Caloplaca luteominia, C.C. Bratt 7864* (SBBG, det. Cole).

20. ***Arthonia phaeophysciae*** **Grube & Matzer**

NOTES. – *Arthonia phaeophysciae* occurs on the thallus of *Phaeophyscia* species. It has been reported from Santa Cruz Island (Hafellner et al. 2002). For a description see Grube (2007).

Representative specimen. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Santa Ana Mountains, Tenaja Canyon, 14.iv.2007, on *Phaeophyscia orbicularis*, *J. Kocourková & K. Knudsen s.n.* (PRM-909650).

21. ***Arthonia xanthoparmeliarum*** **Etayo**

NOTES. – *Arthonia xanthoparmeliarum* is probably frequent, at least in southern California, on thalli of *Xanthoparmelia* species (Knudsen & Kocourková 2009a, Kocourková 2009). For a description see Etayo and Sancho (2008).

Selected representative specimens. – **U.S.A. CALIFORNIA**. LOS ANGELES CO.: Santa Monica Mountains, Rocky Oaks, 14.viii.2009, on *Xanthoparmelia* sp., *J. Kocourková & K. Knudsen s.n.* (PRM-915668, UCR). RIVERSIDE CO.: San Jacinto Mountains, Sugarloaf Mountain, 23.vii.2007, on *X. mexicana*, *J. Kocourková & K. Knudsen s.n.* (PRM-909669, UCR). SAN BERNARDINO CO.: Joshua Tree National Park, upper Covington Flats, on *Xanthoparmelia* sp., *J. Kocourková 8032 & K. Knudsen* (UCR). VENTURA CO.: Santa Monica Mountains, on *X. mexicana*, 24.xi.2008, *J. Kocourková & K. Knudsen s.n.* (PRM-915480).

22. ***Arthonia varians*** **(Davies) Nyl.**

NOTES. – *Arthonia varians* is probably frequent in California on the apothecia of *Lecanora rupicola* (L.) Zahlbr. (Knudsen & Kocourková 2008a; Knudsen et al. 2008a). For a description see Grube (2007).

Selected representative specimens (all on *Lecanora rupicola*). – **U.S.A. CALIFORNIA**. RIVERSIDE CO.: San Jacinto Mountains, 28.vii.2008, *K. Knudsen 9989.2 & J. Kocourková* (UCR). SAN BENITO CO.: San Benito Mountain, 22.iv.2011, *K. Knudsen et al. 13629.1* (UCR). SAN DIEGO CO.: Cuyamaca Peak, 10.x.2007, *K. Knudsen 9138* (UCR).

23. ***Arthrorhaphis aeruginosa* R. Sant. & Tønsberg**

NOTES. – *Arthrorhaphis aeruginosa* occurs on *Cladonia* species causing a distinctive blue infection. The single specimen from California was fertile (Kocourková et al. 2008). For a description see Santesson and Tønsberg (1994).

Representative specimen. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 18.vii.2007, on *Cladonia* species, *J. Kocourková & K. Knudsen* (PRM-909678, UCR).

24. ***Athelia arachnoidea* (Berk.) Jülich**

NOTES. – *Athelia arachnoidea* appears common and causes distinctive infections especially on lichens of Xanthorion communities in southern California. So far none of these populations have been found fertile and the identification is tentative (Knudsen & Kocourková 2010b). For a description see Diederich (2004b). For key to North American species of *Athelia* see Ginns and Worral (1999).

Selected representative specimens. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, 23.xi.2009, on *Lepraria santamonicae* and *Candelariella pacifica, J. Kocourková et al. s.n.* (hb. myco. J.K & K.K), *K. Knudsen et al. 11821* (UCR). RIVERSIDE CO.: San Jacinto Mountains, 16.iv.2007, on *Xanthoria* species, *J. Kocourková & K. Knudsen s.n.* (hb. myco. J.K & K.K).

25. ***Biatoropsis usnearum* Räsänen**

NOTES. – *Biatoropsis usnearum* occurs on *Usnea* species and is probably frequent in California (Diederich 2003). For descriptions see Diederich (1996, 2004c).

Representative specimens. – **U.S.A. CALIFORNIA**. MONTEREY CO.: Lime Kiln State Park, 21.vii.2008, on *Usnea* species, *K. Knudsen et al. 9950.2* (UCR), 14.xiii.2008, *K. Knudsen 10098* (UCR), 4.ix.2008, *K. Knudsen 10208* (UCR). SAN LUIS OBISPO CO.: along Santa Rita Creek Rd., 21.iv.1996, on *Usnea* species, *H. Saylor L-1459* (SBBG, det. Diederich). SONOMA CO.: Armstrong Redwoods State Park, Armstrong Redwoods, 27.iii.1992, on *Usnea cf. pendulina*, *S.C. Tucker 31755-D* (SBBG, det. Diederich), SIERRA CO.: Indian Valley Campground, 2.iv.1992, on *Usnea cf. silesiaca, S.C. Tucker 31865-B* (SBBG, det. Diederich).

26. ***Briancoppinsia cytospora* (Vouaux) Diederich, Ertz, Lawrey & van den Boom**

NOTES. – This specie occurs on a variety of lichens, especially *Flavoparmelia caperata*, in California (Diederich 2003; Kocourková 2000). For a description see Diederich (2004j) under the name *Phoma cytospora* (Vouaux) D. Hawksw. *Briancoppinsia cytospora* occurs on *Cladonia* species too and needs to be distinguished from *Phoma* species on *Cladonia* (Diederich et al. 2012).

Selected representative specimens. – **U.S.A. CALIFORNIA.** ORANGE CO.: Santa Ana Mountains, Fremont Canyon, 3.xii.2007, on *Flavopunctelia flaventior, K. Knudsen 9243* (UCR). RIVERSIDE CO.: Santa Ana Mountains, Santa Rosa Plateau, 5.x.2009, on *F. flaventior*, *K. Knudsen 11716* (UCR). SAN LUIS OBISPO CO.: San Simeon State Park, 10.v.2010, on *Flavoparmelia caperata, K. Knudsen 12114.2* (UCR).

27. ***Buellia badia* (Fr.) A. Massal.**

NOTES. – *Buellia badia* is the most common lichenicolous lichen in cismontane southern California, represented by 72 specimens in the UCR herbarium. It begins as a juvenile parasite on crustose lichens, especially *Aspicilia* species, sometimes first manifesting as apothecia on the host, but eventually developing an independent brown lichenized thallus. For a description see Bungartz et al. (2007).

Representative specimen. – **U.S.A. CALIFORNIA**. LOS ANGELES CO.: Santa Monica Mountains, Topanga Canyon, 7.vii.2003, on *Aspicilia* species, *K. Knudsen 348-B* (UCR, det. Bungartz).

28. ***Buelliella inops* (Triebel & Rambold) Hafellner**

NOTES. – *Buelliella inops* occurs on *Caloplaca* species. Diederich (2003) reported it from Madera County based on a Weber collection of *Caloplaca saxicola* (Hoffm.) Nordin. For a description see Hafellner (2004a).

Selected representative specimens. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Barbara, Rocky Nook Park, 5.viii.1969, on *Caloplaca* species on boulders, *S.C. Tucker 7964-A* (SBBG, det. Knudsen). VENTURA CO.: Santa Monica Mountains, 10.x.2005, on *Caloplaca bolacina, K. Knudsen*

4062 (UCR, hb. Etayo); Conejo Open Space, 24.xi.2008, on *Caloplaca* species, *J. Kocourková 7348 & K. Knudsen* (hb. myco. J.K & K.K).

29. *Buelliella physciicola* Poelt & Hafellner

NOTES. – *Buelliella physciicola* is frequent in California where it occurs on *Phaeophyscia* species (Alstrup & Cole 1998; Diederich 2003; Hafellner 2004a; Knudsen & Kramer 2007; Tucker & Ryan 2006). For a description see Hafellner (2004a).

Selected representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: San Jacinto Mountains, 23.vii.2004, on *Phaeophyscia* species, *K. Knudsen 1520* (UCR); SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 3.i.1994, on *Phaeophyscia* species, *T.H. Nash 32836* (ASU). SAN DIEGO CO.: Warner Hot Springs, 4.x.2005, on *Phaeophyscia* species, *K. Knudsen 3901*(UCR).

30. *Caloplaca epithallina* Lynge

NOTES. – A common species in California on crustose lichens (Tucker & Ryan 2006) which is documented in the UCR Herbarium by 24 collections. Jan Vondrák thinks the California taxon may not be conspecific with the European species on which the name is typified (Vondrák, *pers. comm.*). For a description see Wetmore (2007).

Selected representative specimens. – **U.S.A. CALIFORNIA**. SAN BERNARDINO CO.: San Gabriel Mountains, San Antonio Canyon, 28.x.2011, on unknown crustose lichen, *K. Knudsen 13830 & J. Kocourková* (UCR). TUOLUMNE CO.: Yosemite National Park, 21.ix.2009, on *Aspicilia, J.C. Lendemer 19693* (NY).

31. *Carbonea vitellinaria* (Nyl.) Hertel

NOTES. – *Carbonea vitellinaria* grows on the apothecia of *Candelariella* species and is probably common in California but overlooked (Diederich 2003; Tucker & Ryan 2006). For a description see Knoph et al. (2004).

Selected representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Santa Rosa Mountain, 18.vii.2009, on *Candelariella vitellina*, *K. Knudsen 11498* (UCR). SAN BERNARDINO CO.: San Bernardino Mountains, Onyx Summit, 7.x.2008, on *C. vitellina*, *J.C. Lendemer 14899 & K. Knudsen* (NY).

32. *Cercidospora caudata* Kernst.

NOTES. – *Cercidospora caudata* is common on *Caloplaca* species, especially *C. squamosa* (B. de Lesd.) Zahlbr. and *C. subsoluta* (Nyl.) Zahlbr. (Etayo et al. 2007; Knudsen & Kocourková 2010b & c). For a description see Navarro-Rosinés et al. (2004).

Selected representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Joshua Tree National Park, Wilson Canyon, 23.xii.2010, on *Caloplaca squamosa, K. Knudsen 13255* (UCR). SAN BERNARDINO CO.: Joshua Tree National Park, upper Covington Flats, 5.xi.2011, on *C. squamosa, J. Kocourková 8030 & K. Knudsen* (UCR); Mojave Desert Preserve, Clark Mountains, 17.vi.2009, on *C. squamosa, K. Knudsen et al. 11467* (NY, UCR).

33. *Cercidospora cladoniicola* Alstrup

NOTES. – *Cercidospora cladoniicola* occurs on *Cladonia* species. For descriptions see Alstrup (1997) and Lendemer et al. (2008).

Representative specimens. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 18.vii.2007, on *Cladonia* species, *K. Knudsen & J. Kocourková s.n.* (PRM-909679).

34. *Cercidospora lobothalliae* Nav.-Ros. & Calat.

NOTES. – *Cercidospora lobothalliae* is frequent on *Lobothallia* species in the Mojave Desert (Knudsen & Werth 2008). For description see Navarro-Rosinés et al. (2004).

Selected representative specimens. – **U.S.A. CALIFORNIA.** SAN BERNARDINO CO.: Granite Mountains, 20.xii.2007, on *Lobothallia praeradiosa, K. Knudsen 9410* (UCR), 7.vi.2008, *K. Knudsen 9706* (UCR); Little San Bernardino Mountains, 9.iv.2006, on *L. praeradiosa*, *K. Knudsen 5775* (UCR).

35. *Cercidospora macrospora* (Uloth) Hafellner & Nav.-Ros.

NOTES. – *Cercidospora macrospora* is frequent in California on members of the *Lecanora muralis* group (Knudsen & Kocourková 2009a, Knudsen & Werth 2008, Tucker & Ryan 2006). For a description see Navarro-Rosinés et al. (2004).

Selected representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: San Jacinto Mountains, 4.v.2009, on *Lecanora mellea, K. Knudsen 11031* (NY, UCR). SAN BERNARDINO CO.: Granite Mountains, 7.vi.2008, on *L. garovaglioi, K. Knudsen 9713* (UCR). VENTURA CO.: Santa Monica Mountains, Thousand Oaks, 24.xi.2008, on *L. muralis, J. Kocourková 7349 & K. Knudsen* (hb. myco. J.K & K.K).

36. *Cercidospora xanthoriae* (Wedd.) R. Sant.

NOTES. – *Cercidospora xanthoriae* grows on *Xanthoria* and *Xanthomendoza* species. For details of the ascospore shape and size see Knudsen and Lendemer (2006) and Navarro-Rosinés et al. (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN DIEGO CO.: Warner Hot Springs Ranch, 19.iv.2005, on *Xanthomendoza fallax*, *K. Knudsen et al. 3900* (UCR, hb. Etayo).

37. *Chaenothecopsis epithallina* Tibell

NOTES. – *Chaenothecopsis epithallina* occurs on the thallus of *Chaenotheca trichialis* (Ach.) Th. Fr. and was reported from California based on collections by Eric Petersen from Trinity County (Rikkinen 2003). For a description see Ahti et al. (1999).

38. *Chaenothecopsis pusilla* (Ach.) A.F.W. Schmidt

NOTES. – *Chaenothecopsis pusilla* is saprobic or parasitic on free-living algae or lichens. For a description see Tibell and Ryan (2004) in which it is reported from southern California without the citation of specific specimens.

39. *Clypeococcum hypocenomycis* D. Hawksw.

NOTES. – *Clypeococcum hypocenomycis* grows usually on *Hypocenomyce scalaris* (Ach.) M. Choisy. It was recently reported from Point Reyes National Seashore (Glacy et al. 2011). For a description see Ertz (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: San Jacinto Mountains, 16.iv.2007, on *Hypocenomyce scalaris, J. Kocourková & K. Knudsen s.n.* (PRM-909119).

40. C*ornutispora ciliata* Kalb

NOTES. – This anamorphic fungus occurs on a wide range of lichen hosts but is currently known in California only from a single report (Kocourková & Knudsen 2007). For a description see Gierl and Kalb (1993).

Representative specimen. – **U.S.A. CALIFORNIA**. RIVERSIDE CO.: Santa Ana Mountains, Elsinore Peak, 12.iv.2007, on *Evernia prunastri*, *J. Kocourková & K. Knudsen s.n.* (PRM-909116).

41. *Cystobasidium hypogymniicola* Diederich & Ahti

NOTES. – *Cystobasidium hypogymniicola* grows on *Hypogymnia* species. For descriptions see Diederich (1996 & 2004d).

Representative specimens. – **U.S.A. CALIFORNIA.** SIERRA CO.: Tahoe National Forest, 2.iv.1992, on *H. imshaugii*, *S.C. Tucker 31841* (SBBG, det. Diederich).

42. *Cystobasidium usneicola* Diederich & Alstrup

NOTES. – *Cystobasidium usneicola* grows on *Usnea* species. It was reported from Mendocino County by Diederich (2003). For descriptions see Diederich (1996 & 2004d).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN DIEGO CO.: sine loc., on *Usnea*, *E. Palmer s.n.* (SBBG, det. Diederich).

43. *Dacampia lecaniae* Kocourk. & K. Knudsen

NOTES. – *Dacampia lecaniae* occurs on *Lecanica fuscella* (Schaer.) Körb. and is currently only known from the type collection made on West Anacapa Island (Kocourková & Knudsen 2010; Knudsen & Kocourková 2010a)

Representative specimen. – **U.S.A. CALIFORNIA**. VENTURA CO.: Channel Islands National Park, West Anacapa Island, terrace at west end, 2.xii.2008, on *Lecania fuscella, K. Knudsen 10800* (UCR).

44. *Dactylospora parasitica* (Flörke) Zopf

NOTES. – *Dactylospora parasitica* occurs on *Pertusaria* and *Ochrolechia* species. See Hafellner (2004b) for a description. The following specimens verify its occurrence in California.

Representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Santa Ana Mountains, Santa Rosa Plateau, 29.iii.2007, on *Pertusaria amara, K. Knudsen 8286* (UCR). SAN DIEGO CO.: Palomar Mountain, 20.iv.2005, on *P. albescens*, *K. Knudsen 2734* (UCR, hb. Etayo).

45. *Dactylospora pleiosperma* Triebel

NOTES. – *Dactylospora pleiosperma* occurs on the chemical variant of *Lecanora caesiorubella* Ach. that has been referred previously as *L. caesiorubella* subsp. *merrillii* Imsh. & Brodoand. It is currently considered a California endemic (Hafellner 2004b, Hafellner et al. 2002, Knudsen & Kocourková 2009a). For a description see Hafellner (2004b).

Selected representative specimens. – **U.S.A. CALIFORNIA.** SAN LUIS OBISPO CO.: Los Osos, 20.vii.2008, *K. Knudsen 9928 & J. Kocourková* (UCR). VENTURA CO.: Santa Monica Mountains, Point Mugu State Park, 13.viii.2009, *J. Kocourková & K. Knudsen s.n.* (PRM-915667).

46. *Dactylospora saxatilis* (Schaer.) Hafellner

NOTES. – *Dactylospora saxatilis* occurs on *Pertusaria* species. For a description see Hafellner (2004b).

Representative specimens. – **U.S.A. CALIFORNIA**. SAN BERNARDINO CO.: San Bernardino Mountains, 7.x.2008, on *Pertusaria* species, *J.C. Lendemer 14965A & K. Knudsen* (NY). SANTA BARBARA CO.: Santa Rosa Island, 15.x.2006, on *P. flavicunda*, *Knudsen 7496.2* (UCR).

47. *Dimelaena californica* (H. Magn.) Sheard

NOTES. – *Dimelaena californica* is a juvenile parasite usually on *D. radiata* (Tuck.) Müll. Arg. It eventually develops a glossy brown independent lichenized thallus. It is endemic to the coast of California and Baja Mexico and frequent on the Channel Islands (Knudsen 2008, Knudsen & Kocourková 2010a, Sheard 2004a). For a description see Sheard (2004a).

Selected representative specimens. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Channel Islands National Park, Santa Cruz Island, Frasier Point, 23.ix.1997, on *Dimelaena radiata*, *S.C. Tucker 35717* (SBBG), *S.C. Tucker 35735* (SBBG); Santa Rosa Island, above the Pacific on eastern part of Sierra Pablo Ridge, 19.vii2007, on *D. radiata*, *K. Knudsen 8703.2* (UCR).

48. *Diplolaeviopsis ranula* Giralt & D. Hawksw.

NOTES. – *Diplolaeviopsis ranula* is an anamorphic fungus that usually occurs on *Lecanora strobilina* (Spreng.) Kiefer (Etayo et al. 2007). For a description see Giralt and Hawksworth (1991).

Representative specimens. – **U.S.A. CALIFORNIA.** SAN DIEGO CO.: Point Loma Ecological Reserve, Navy area, 10.v.2007, on *Lecanora strobilina*, *K. Knudsen 8351* (PRM-848908); Torrey Pines State Park, 14.xii.2011, on *L. strobilina, K. Knudsen 14486 & M. Michalová* (UCR).

49. *Diploschistes muscorum* (Scop.) R. Sant.

NOTES. – A common lichenicolous lichen in California (Tucker & Ryan 2006) represented by 38 specimens in UCR Herbarium from southern and central California. It begins as a juvenile parasite on *Cladonia* species and develops an independent white lichenized thallus. On the Channel Islands it also occurs as a juvenile parasite on *Leprocaulom microscopicum* (Vill.) Gams ex D. Hawksw. and *Lepraria xerophila* Tønsberg (Knudsen & Kocourková 2010a). The specimen cited below is good example of *D. muscorum* morphing out of thallus of a *Cladonia* species.

Representative specimen. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Wildomar, Menifee Hills, 22.viii.2003, *K. Knudsen 418* (UCR).

50. ***Echinodiscus lesdainii* (Vouaux) Etayo & Diederich**

NOTES. – *Echinodiscus lesdainii* occurs on the apothecia of *Lecania cyrtella* (Ach.) Th. Fr. and two related species of *Lecania*. In California it is known from a single collection (Knudsen & Kocourková 2010b, Kocourková et al. 2010). For description see Etayo and Diederich (2000).

Representative specimen. – **U.S.A. CALIFORNIA**. VENTURA CO.: Santa Monica Mountains, Point Mugu State Park, 13.vii.2009, on *Lecania cyrtella*, *K. Kocourková et. al. 7344* (hb. myco. J.K. & K.K.).

51. ***Endococcus incrassatus* Etayo & Breuss**

NOTES. – *Endococcus incrassatus* is endemic to southern California and Baja California where it occurs on *Placidiopsis cinerascens* (Nyl.) Breuss, a rare species in the region (Knudsen & Kocourková 2008a). For a description see Kainz and Triebel (2002).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN DIEGO CO.: Anza-Borrego Desert State Park, 15.iii.2008, *K. Knudsen et. al. 9538* (PRM, UCR).

52. ***Endococcus matzeri* D. Hawksw. & Iturr.**

NOTES. – *Endococcus matzeri* occurs on *Buellia* species, *Dimelaena radiata,* and on *Mobergia angelica* (Stizenb. ex Hasse) H. Mayrhofer & Sheard in California (Knudsen & Kocourková 2009a). The name *Endococcus buelliae* (C.W. Dodge) Matzer has been misapplied to this taxon in the past (Hawksworth & Iturriaga 2006). For a description see Kainz and Triebel (2002) under the name *E. buelliae*. In that work it was reported from the Channel Islands without the citation of supporting voucher specimen.

Selected representative specimens. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO: Channel Islands National Park, Santa Rosa Island, 18.vii.2007, on *Buellia venusta*, *J. Kocourková & K. Knudsen s.n.* (PRM-909682). VENTURA CO.: Santa Monica Mountains, Conejo Open Space, 1.v.2009, on *Mobergia angelica*, *K. Knudsen et al. 10697* (UCR).

53. ***Endococcus oreinae* Hafellner**

NOTES. – *Endococcus oreinae* is apparently a rare species on *Dimelaena oreina* (Ach.) Norman (Hafellner etal. 2002, Knudsen & Kocourková 2007). It is reported below from a new host, the western North American endemic *D. thysanota* (Tuck.) Hale & W.L. Culb. For description see Kainz and Triebel (2002).

Representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Santa Ana Mountains, Santa Rosa Plateau, 8.xii.2006, on *Dimelaena oreina, K. Knudsen 7969.1* (UCR). SAN BERNARDINO CO.: Joshua Tree National Park, Queen Mountain, 5.x.2011, on *D. thysanota, K. Knudsen 13738 & M. Harding* (UCR).

54. ***Endococcus rugulosus* Nyl.**

NOTES. – *Endococcus rugulosus* s. str. occurs on *Verrucaria* species (Kocourková 2000, Kocourková & Knudsen 2011b, Serusiaux et al. 1999). For a description see Serusiaux et al. (1999).

Representative specimen. – **U.S.A. CALIFORNIA**. LOS ANGELES CO.: Santa Monica Mountains, Hepatic Gulch, 5.xii.2009, on *Verrucaria furfuracea*, *J. Kocourková s.n. & K. Knudsen* (UCR, hb. myco. J.K. & K.K.)

55. ***Endococcus stigma* (Körb.) Stizenb.**

NOTES. – In California *Endococcus stigma* is frequent on brown species of *Acarospora* and the yellow species *A. socialis* H. Magn. (Knudsen 2007; Knudsen & Kocourková 2007, 2009a, 2010b). For a description see Kainz and Triebel (2002).

Selected representative specimens. – **U.S.A. CALIFORNIA**. LOS ANGELES CO.: Santa Monica Mountains, 5.xii.2009, on brown *Acarospora* species, *J. Kocourková & K. Knudsen s.n.* (UCR). . RIVERSIDE CO.: Joshua Tree National Park, Lost Horse Mountains, 26.xii.2010, on *A. elevata, K. Knudsen 13367.1* (UCR). SAN BERNARDINO CO.: Joshua Tree National Park, Eureka Peak, 22.ii.2006, on *A. obnubila*, *K. Knudsen et al. 5231* (UCR); San Gabriel Mountains, San Antonio Canyon, 28.x.2010, on *A. socialis, J. Kocourková 8019 & K. Knudsen* (hb. myco. J.K. & K.K.)

56. *Endococcus thelommatis* Kocourk. & K. Knudsen

NOTES. – *Endococcus thelommatis* occurs on *Thelomma santessonii* Tibell in southern California. For a description and notes on the distribution see Kocourková and Knudsen (2011b).

Representative specimen. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, South Point, 14.vi.2009, on *Thelomma santessonii*, *K. Knudsen 11421 & S. Chaney* (UCR, hb. Diederich, hb. myco. J.K. & K.K).

57. *Endococcus zahlbrucknerellae* (Henssen) D. Hawksw.

NOTES. – *Endococcus zahlbrucknerellae* is only known from the type collection made on *Zahlbrucknerella californica* Henssen (1977) in Humboldt County.

58. *Heteroplacidium zamenhofianum* (Clauzade & Cl. Roux) Gueidan & Cl. Roux

NOTES. – *Heteroplacidium zamenhofianum* is a juvenile parasite on *Staurothele* species on calcareous substrates. It develops an independent brown thallus and is apparently rare in southern California where it is known only from Cactus Flats in the San Bernardino Mountains (Knudsen 2005). For a description see Breuss (2007) as *Verrucaria zamenhofiana* Clauzade and Cl. Roux.

Representative specimen. – **U.S.A. CALIFORNIA.** SAN BERNARDINO CO.: San Bernardino Mountains, Cactus Flats, 9.vi.2005, on *Staurothele* species, *K. Knudsen 3383* (UCR, det. Breuss).

59. *Intralichen baccisporus* D. Hawksw. & M.S. Cole

NOTES. – This is probably a common anamorphic fungus on the apothecia of *Caloplaca* species (Hawksworth & Cole 2002, Knudsen & Kocourková 2007). For a description and keys see Hawksworth and Cole (2002).

Selected representative specimens. – **U.S.A. CALIFORNIA**. LOS ANGELES CO.: Leo Carrillo State Park, 14.viii.2008, on *Caloplaca bolacina, J. Kocourková & K. Knudsen s.n.* (PRM-915679); San Clemente Island, 27.ix.1996, on *Caloplaca* species, *C. Bratt 9584* (SBBG, det. Cole). MONTEREY CO.: Pacific Valley, 12.v.2009, on *C. rosei, K. Knudsen 11069.3* (UCR). RIVERSIDE CO.: Joshua Tree National Park, Covington Flats, 5.xi.2011, on *Caloplaca* species, *J. Kocourková 8036 & K. Knudsen* (UCR). SAN LUIS OBISPO CO.: San Simeon State Park, 8.i.2007, on *C. impolita*, *K. Knudsen 8096* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Cruz Island, 2.x.1990, on *C. brattiae*, *C. Bratt 7223* (SBBG, det. Cole)*;* Santa Rosa Island, above tributary of Water Canyon, 20.vii.2007, on *C. bolacina*, *J. Kocourková & K. Knudsen s.n.* (PRM-909535).

60. *Intralichen christiansenii* (D. Hawksw.) D. Hawksw. & M.S. Cole

NOTES. – A common anamorphic fungus on wide range of hosts. For a description and keys see Hawksworth and Cole (2002).

Representative specimens. – **U.S.A. CALIFORNIA.** LAKE CO.: Bartlett Springs Road, 26.iii1988, on *Letharia vulpina*, *S.C. Tucker 28798* (SBBG, det. Triebel). SAN DIEGO CO.: Point Loma, 30.vii.2008, on *Lecanora* species, *J. Kocourková 6916 & K. Knudsen* (hb. myco. J.K. & K.K.). SISKIYOU CO.: Mt. Shasta, 10.viii.1975, on *Letharia vulpina*, *S.C. Tucker 14848B* (SBBG, det. Triebel).

61. *Intralichen lichenicola* (M.S. Christ. & D. Hawksw.) D. Hawksw. & M.S. Cole

NOTES. – *Intralichen lichenicola* occurs on a wide range of genera and species (Hawksworth & Cole 2002). It is here reported new for North America and California. For a description and keys see Hawksworth & Cole (2002).

Representative specimen. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, along Burma Road, 20.vii.2007, on *Lecanora dispersa* group, *J. Kocourková & K. Knudsen s.n.* (PRM-909118).

62. ***Lecania caloplacicola* B.D. Ryan & van den Boom**

NOTES. – *Lecania caloplacicola* is a juvenile parasite on saxicolous *Caloplaca* species, developing an independent thallus. It is endemic to Santa Rosa Island where it is known from three collections. For a description see van den Boom and Ryan (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 19.viii.2007, morphing out of *Caloplaca bolacina* and with an independent thallus, *K. Knudsen et al. 8923* (UCR).

63. ***Lichenochora verrucicola*** **(Wedd.) Nik. Hoffm. & Hafellner**

NOTES. – *Lichenochora verrucicola* is frequent in California on *Aspicilia* and *Circinaria* species (Knudsen 2006, Knudsen & Werth 2008, Knudsen et al. 2008a). For a description see Hafellner and Navarro-Rosinés (2004).

Selected representative specimens. – **U.S.A. CALIFORNIA.** SAN DIEGO CO.: Cuyamaca Mountains, 6.x.2007, on *A. cuprea, K. Knudsen 9078* (UCR); Palomar Mountain, 13.v.2005, on *Aspicilia* species, *Knudsen 2934.2* (UCR). SAN BERNARDINO CO.: Granite Mountains, 20.xii.2007, on *Circinaria arida, K. Knudsen 9401* (UCR).

64. ***Lichenochora xanthoriae*** **Triebel & Rambold**

NOTES. – *Lichenochora xanthoriae* occurs on *Xanthoria elegans* in Arizona and California (Hafellner & Navarro-Rosinés 2004, Knudsen 2005). For a description see Hafellner and Navarro-Rosinés (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN BERNARDINO CO.: San Bernardino Mountains, Cactus Flats, 7.vi.2005, on *Xanthoria elegans, K. Knudsen 3305* (UCR).

65. ***Lichenoconium cargillianum*** **(Linds.) D. Hawksw.**

NOTES. – The anamorphic fungus *Lichenoconium cargillianum* was reported from a Wetmore collection from Tulare County on *Letharia vulpina* (Cole & Hawksworth 2004). For keys and descriptions of the genus see Cole and Hawksworth (2004).

66. ***Lichenoconium erodens*** **M.S. Christ. & D. Hawksw.**

NOTES. – This common cosmopolitan anamorphic fungus occurs on a wide variety of hosts (Knudsen & Kocourková 2007, Knudsen et al. 2008a, Knudsen & Kocourková 2009a, Kocourková 2000). For keys and descriptions see Cole and Hawksworth (2004) and Diederich (2004e).

Selected representative specimens. – **U.S.A. CALIFORNIA**. LOS ANGELES CO.: Leo Carrillo State Park, 14.viii.2009, on *Xanthoparmelia cumberlandia*, *J. Kocourková & K. Knudsen s.n.* (PRM-915671); same locality, 14.viii.2009, on *Evernia prunastri*, *J. Kocourková & K. Knudsen, s.n.* (PRM-915672). RIVERSIDE CO.: Santa Ana Mountains, Elsinore Peak, 12.iv.2007, on *Hypogymnia imshaugii*, *J. Kocourková & K. Knudsen s.n.* (PRM-909127); Santa Rosa Plateau, 12.x.2008, on *Flavopunctelia flaventior*, *K. Knudsen 10434* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, north slope of Black Mountain, 18.vii.2007, on *Hypogymnia mollis, J. Kocourková & K. Knudsen s.n.* (PRM 909708); above the Pacific on eastern part of Sierra Pablo Ridge, 19.vii.2007, on *Cladonia maritima*, *J. Kocourková & K. Knudsen s.n.* (PRM-909700). SAN DIEGO CO.: Cuyamaca Mountains, on *Lecanora* species, *K. Knudsen 9198* (UCR); Point Lobos Ecological Preserve, 30.vii.2008, on *Parmotrema hypotropum*, *J. Kocourková 6930 & K. Knudsen* (hb. myco. J.K. & K.K.)

67. ***Lichenoconium lecanorae*** **(Jaap) D. Hawksw.**

NOTES. – *Lichenoconium lecanorae* is usually found on the apothecia of *Lecanora* and *Parmelia* species. Diederich (2003) cited a collection from Santa Barbara County on a lignicolous *Lecanora.* For keys and descriptions see Cole and Hawksworth (2004) and Diederich (2004e).

Representative specimens. – **U.S.A. CALIFORNIA**. ORANGE CO.: Santa Ana Mountains, 13.xii.2007, on *Lecanora muralis, K. Knudsen 9360* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 18.vii.2007, on *Niebla homalea*, *J. Kocourková & K. Knudsen s.n.* (PRM-909707). SAN LUIS OBISPO CO.: San Simeon State Park, 10.v.2010, on *L. pacifica, K. Knudsen 12110* (UCR).

68. ***Lichenoconium lichenicola*** **(P. Karst.) Petr. & Syd.**

NOTES. – *Lichenoconium lichenicola* has been collected in California on *Physcia* species (Etayo et al. 2007; Knudsen et al. 2008b). For keys and descriptions see Cole and Hawksworth (2004) and Diederich (2004e).

Selected representative specimens. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 20.vii.2007, on *Physcia* species, *J. Kocourková & K. Knudsen s.n.* (PRM-909120). VENTURA CO.: Santa Monica Mountains, Point Mugu State Park, 13.viii.2009, on

Physcia tenella, *J. Kocourková et. al. 7345* (hb. myco. J.K. & K.K.); Sandstone Peak, 23.v.2007, on *Physcia* species, *K. Knudsen 8467A* (PRM).

69. *Lichenoconium usneae* (Anzi) D. Hawksw.

NOTES. – *Lichenoconium usneae* occurs on a wide variety of hosts. Diederich (2003) cited a collection on *Ramalina* from San Benito County (Diederich 2003). For keys and descriptions see Cole and Hawksworth (2004) and Diederich (2004e).

70. *Lichenoconium xanthoriae* M. S. Christ.

NOTES. – *Lichenoconium xanthoriae* occurs on a wide variety species of Teloschistaceae. For keys and descriptions see Cole and Hawksworth (2004) and Diederich (2004e).

Representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Santa Ana Mountains, Santa Rosa Plateau, 11.x.2008, on *Xanthoria tenax*, *K. Knudsen 10433* (UCR). VENTURA CO.: Santa Monica Mountains, Point Mugu State Park, 13.viii.2009, on *Xanthomendoza fulva*, *J. Kocourková et. al s.n.* (hb. Myco. J.K. & K.K.).

71. *Lichenodiplis dendrographae* Diederich & van den Boom

NOTES. – *Lichenodiplis dendrographae* occurs on *Dendrographa leucophaea* (Tuck.) Darb. and is only known from the type locality in Morro Bay State Park (Diederich 2003). For a description see Diederich (2004f).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN LUIS OBISPO CO.: Morro Bay State Park, 27.ix.2006, on *Dendrographa leucophaea*, *K. Knudsen 7349* (UCR).

72. *Lichenodiplis lecanorae* (Vouaux) Dyko & D. Hawksw.

NOTES. – *Lichenodiplis lecanorae* occurs mostly on the apothecia of *Caloplaca* and *Lecanora* species. Diederich cited a collection from Point Sal Ridge on *Caloplaca* in Santa Barbara County (Diederich 2003). For a description see Diederich (2004f).

Selected representative specimens. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, 14.viii.2009, on *Caloplaca cerina*, *J. Kocourková & K. Knudsen s.n.* (PRM-915674). MARIN CO.: Point Reyes National Seashore, 10.vi.2008, on *Lecanora*, *M. Seaward 115593* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island,18.vii.2007 on *L. caesiorubella*, *J. Kocourková & K. Knudsen s.n.* (PRM-914996).

73. *Lichenodiplis lecanoricola* (M.S. Cole & D. Hawksw.) Diederich

NOTES. – *Lichenodiplis lecanoricola* usually occurs on the apothecia of corticolous *Lecanora* species. For a description see Diederich (2004f).

Representative specimen. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 2.i.1994, on *Lecanora, T.H. Nash 32764* (ASU).

74. *Lichenodiplis rinodinicola* Kocourk. & K. Knudsen

NOTES. – *Lichenodiplis rinodinicola* is currently only known from the type locality where it was collected on a *Rinodina* species on bark. For a description see Knudsen and Kocourková (2009a).

Representative specimen. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, Leo Carrillo State Park, 14.viii.2009, on apothecia of *Rinodina* sp., *J. Kocourková 7323 & K. Knudsen* (PRM-915674).

75. *Lichenostigma amplum* Calat. & Hafellner

NOTES. – *Lichenostigma amplum* occurs on *Buellia* species in coastal California and is frequent on Santa Rosa Island (Knudsen & Kocourková 2009a, Kocourková & Knudsen 2008). For a description see Calatayud et al. (2004).

Rrepresentative specimens. – **U.S.A. CALIFORNIA.** MONTEREY CO.: Pacific Valley, 12.v.2009, on *Buellia maritima, K. Knudsen 11041.2* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 18.vii.2007, on *B. venusta*, *J. Kocourková & K. Knudsen s.n.* (PRM-909667, UCR); South Peak, 15.viii.2007, on *B. dispersa, K. Knudsen 8763.5* (UCR); Lobo Canyon, 16.x.2006, on *B. sequax, Knudsen 7606.2* (UCR). SAN DIEGO CO.: Point Loma, 20.v.2008, on *B. maritima, Knudsen 9613* (UCR).

76. *Lichenostigma anatolicum* Halici & Kocakaya

NOTES. – *Lichenostigma anatolicum* was described from Turkey (Halici et al. 2009) and is only known in North America from Orange County (Lendemer et al. 2009b).

Representative specimens. – **U.S.A. CALIFORNIA.** ORANGE CO.: Santa Ana Mountains, Fremont Canyon, 3.xii.2007, on *Acarospora veronensis*, *K. Knudsen 9266* (UCR).

77. *Lichenostigma bolacinae* Nav.-Ros., Calat. & Hafellner

NOTES. – *Lichenostigma bolacinae* occurs only on *Caloplaca bolacina* (Tuck.) Herre in coastal California (Kocourková & Knudsen 2008). For a description see Calatayud et al. (2004).

Representative specimens. – **U.S.A. CALIFORNIA.** ORANGE CO.: Santa Ana Mountains, Weir Canyon, 20.v.2006, on *Caloplaca bolacina, K. Knudsen 6235* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, Water Canyon, 20.vii.2007, on *C. bolacina, J. Kocourková & K. Knudsen s.n.* (PRM-909668, UCR), Burma Road, 18.vii.2007, on *C. bolacina*, *J. Kocourková & K. Knudsen s.n.* (PRM 909662), above St. Augustine Canyon, 17.viii.2007, on *C. bolacina*, *K. Knudsen et. al. 8820* (UCR).

78. *Lichenostigma cosmopolites* Hafellner & Calat.

NOTES. – *Lichenostigma cosmopolites* occurs on *Xanthoparmelia* species and is a common lichenicolous fungus in California (Knudsen et al. 2008a; Knudsen & Kocourková 2009a, c). For a description see Calatayud et al. (2004). All specimens cited below are on unidentified *Xanthoparmelia* species unless otherwise stated.

Selected representative specimens. – **U.S.A. CALIFORNIA.** ORANGE CO.: Santa Ana Mountains, 3.xii.2007, *K. Knudsen 9426* (UCR). MONTEREY CO.: Santa Lucia Mountains, Lime Kiln State Park, 14.viii.2008, *K. Knudsen 10103.1 & M. Walgren* (UCR). RIVERSIDE CO.: San Jacinto Mountains, 10.i.2008, *J.C. Lendemer 11437 & K. Knudsen* (NY); Wildomar, Menifee Hills, 7.iv.2007, *K. Knudsen 8288* (UCR). SAN DIEGO CO.: Cuyamaca Mountains, 6.x.2007, *K. Knudsen 9080* (UCR). SAN LUIS OBISPO CO.: San Simeon State Park, 1.iv.2010, *K. Knudsen 12089* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Cruz Island, 1.iv.2010, *K. Knudsen 12006* (UCR); Santa Rosa Island, 18.vii.2007, *K. Knudsen 8613 & J. Kocourková* (UCR), on *Xanthoparmelia mexicana*, *J. Kocourková & K. Knudsen s.n.* (PRM-909699).VENTURA CO.: Santa Monica Mountains, 9.ix.2006, *K. Knudsen 7155 & R. Muertter* (UCR).

79. *Lichenostigma elongatum* Nav.-Ros. & Hafellner

NOTES. – *Lichenostigma elongatum* occurs on *Aspicilia, Circinaria* and *Lobothallia* species. *Lichenostigma* on *Aspicilia* in California may not be *L. elongatum* but one of three possibly undescribed taxa. Relatively frequent in California (Calatyud et al. 2004, Diederich 2003, Hafellner et al. 2002). For a description see Calatayud et al. (2004). All specimens cited below are on unidentified *Aspicilia* species unless otherwise stated.

Selected representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Santa Ana Mountains, Santa Rosa Plateau, 11.xii.2006, *K. Knudsen 7974* (UCR). SAN BERNARDINO CO.: Granite Mountains, 12.xii.2006, *K. Knudsen 7985* (UCR), 13.xii.2006, on *Lobothallia* species, *K. Knudsen 8026* (UCR). SAN DIEGO CO.: Camp Pendelton, 10.xi.2005, *N.K. Cione 26* (UCR). VENTURA CO.: Santa Monica Mountains, 24.v.2007, *K. Knudsen 8491.2* (UCR).

80. *Lichenostigma maureri* Hafellner

NOTES. – *Lichenostigma maureri* occurs on a wide range of fruticose lichens. This taxon was originally reported for California by Esslinger and Egan (1995), under “New Records”, based on *Eisen s.n.*, 1876, foothills above Tollhouse in Fresno, on *Letharia columbiana* (UPS, det. Santesson). For a description see Calatayud et al. (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** LAKE CO.: Road from Potter Valley to Lake Pillsbury, 1.i.1997, on *Usnea scabrata*, *Tucker 35382* (SBBG, det. Diederich).

81. *Lichenostigma radicans* Calat. & Barreno

NOTES. – This is a rare species in Europe on *Aspicilia* (Calatayud & Barreno 2003) and is rare in southern California, known from a single collection on *Aspicilia* on Santa Rosa Island (Knudsen & Kocourková 2008a).

Representative specimen. – **U.S.A. CALIFORNIA.** Channel Islands National Park, Santa Rosa Island, 15.viii.2007, on *Aspicilia pacifica, K. Knudsen et al. 8778.2* (PRM-909683, UCR).

82. *Lichenostigma rugosum* Thor

NOTES. – *Lichenostigma rugosum* occurs on *Diploschistes* species and is locally frequent in southern California (Glacey et al. 2011; Knudsen & Kocourková 2007, 2009c), but absent from many populations of the host genus.

Selected representative specimens. – **U.S.A. CALIFORNIA.** ORANGE CO.: Santa Ana Mountains, Fremont Canyon, 3.xii.2007, on *Diploschistes* species, *K. Knudsen 9279* (UCR). SANTA BARBARA CO.: Channel Islands National Park, 15.viii.2007, on *D. euganeus, K. Knudsen 8763.2* (UCR). SONOMA CO.: McMurray Ranch Winery, 12.vii.2008, on *Diploschistes* species, *K. Knudsen 9881 & J. Kocourková* (UCR).

83. *Lichenostigma saxicola* K. Knudsen & Kocourk.

NOTES. – This recently described species is common in arid areas of southern California where it grows on a wide range of crustose lichens and the adjacent rock, especially in the Mojave Desert. It can only be confused with *Lichenothelia convexa* Henssen (see below). Both species grow in San Antonio Canyon in the San Gabriel Mountains. At 6000 feet *L. convexa* grows in the shade of pines on a montane saxicolous lichen community. At 5000 feet, in an open sunny location surrounded by *Yucca*, *L. saxicola* grows on a mixed saxicolous community of arid, lower elevation as well as montane species. For a description see Knudsen & Kocourková (2010c).

Selected representative specimens. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, 7.x.2009, on *Caloplaca* species, *K. Knudsen 11739* (UCR). MARIPOSA CO.: Yosemite National Park, 25.iv.2011, on *Pleopsidium flavum*, *K. Knudsen 13665* (UCR). SAN BERNARDINO CO.: San Gabriel Mountains, San Antonio Canyon, 28.x.2011, on *Lecidea tessellata, K. Knudsen 13843 & J. Kocourková* (UCR). SAN DIEGO CO.: Hot Spring Mountain, 4.x.2005, on *Polysporina simplex*, *K. Knudsen et. al. 3881* (UCR).

84. *Lichenostigma subradians* Hafellner, Calat. & Nav.-Ros.

NOTES. – *Lichenostigma subradians* occurs on yellow and brown *Acarospora* species in California and is especially common on *A. socialis* (Knudsen et al. 2008a; Knudsen & Kocourková 2009b, c; Knudsen & LaDoux 2005; Knudsen & Werth 2008). For a description see Calatayud et al. (2004). All specimens cited below are on *A. socialis* unless otherwise noted.

Selected representative specimens. – **U.S.A. CALIFORNIA.** ORANGE CO.: Santa Ana Mountains, Fremont Canyon, 5.xii.2007, *K. Knudsen 9295* (UCR). RIVERSIDE CO.: Joshua Tree National Park, Malapai Hill, 2.xii.2010, on *Acarospora elevata, K. Knudsen 12637.1* (UCR); Santa Rosa Mountain, 18.vii.2009, on *A. rosulata, K. Knudsen et al. 11482* (UCR). SAN BERNARDINO CO.: Mojave Natural Preserve, Clark Mountains, 17.vi.2009, on *A. strigata, K. Knudsen et al. 11442* (UCR); San Gabriel Mountains, San Antonio Canyon, 28.x.2011, *J. Kocourková 8020 & K. Knudsen* (hb. myco. J.K. & K.K.). SAN DIEGO CO.: Anza-Borrego Desert State Park, Yaqui Pass, 28.iv.2006, *K. Knudsen 5908 & R. Muertter* (UCR); UC Dawson Preserve, 21.xii.2005, *K. Knudsen et al. 4761* (UCR).SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 15.x.2006, *K. Knudsen 7464* (UCR).

85. *Lichenothelia convexa* Henssen

NOTES. – This common European saxicolous microfungus is usually a montane species in California. It can only be confused with *Lichenostigma saxicola* from which it differs in usually having larger stromata with larger saccate or clavate asci and a K/I+ blue centrum. It is opportunistically lichenicolous on saxicolous lichens and appears to be less pathogenic than *L. saxicola*. For descriptions see Kocourková and Knudsen (2011a).

Representative specimens. – **U.S.A. CALIFORNIA.** SAN BERNARDINO CO.: Joshua Tree National Park, 2.xii.2010, on unknown host and monzogranite, stromata reduced, *K. Knudsen 12564* (GZU, NY, UCR); San Gabriel Mountains, San Antonio Canyon, Menker Flat, 28.x.2011, on granite and *Aspicilia* species, *J. Kocourková 8022 & K. Knudsen* (hb. myco. J.K. & K.K.).

86. *Lichenothelia renobalesiana* D. Hawksw. & V. Atienza

NOTES. – *Lichenothelia renobalesiana* is a parasite on *Verrucaria* species occuring on limestone. It was reported new for North America from California (Kocourková & Knudsen 2008). For a description see Atienza and Hawksworth (2008).

Representative specimen. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, 6.iv.2008, on *Verrucaria muralis*, *K. Knudsen et al. 9660.2* (UCR).

87. *Lichenothelia scopularia* (Nyl.) D. Hawksw.

NOTES. – This common saxicolous microfungus appears to be opportunistically lichenicolous and was collected in Yosemite where it was parasitic on *Aspicilia* (Lendemer et al. 2010). For a description of the species see Hawksworth (1981).

Selected representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Wildomar, Menifee Hills, 2.i.2004, on granite, *K. Knudsen 2123* (UCR). TUOLUMNE CO.: Yosemite National Park, 19.ix.2009, on *Aspicilia* and silicate rock, *Knudsen 11616* (UCR, YOSE).

88. *Llimoniella acarosporicola* (Kocourk. & K. Knudsen) Diederich & Ertz

(Syn. *Gelatinopsis acarosporicola* Kocourk. & K. Knudsen)

NOTES. – *Llimoniella acarosporicola* grows on *Acarospora socialis*. It is currently only known from the type collection. For a description see Kocourková and Knudsen (2009a).

Representative specimen. – **U.S.A. CALIFORNIA.** ORANGE CO.: Santa Ana Mountains, Fremont Canyon, 15.x.2007, on *Acarospora socialis*, *K. Knudsen 9236* (MSC, MSC, hb. Diederich).

89. *Marchandiomyces corallinus* (Roberge) Diederich & D. Hawksw.

NOTES. – *Marchandiomyces corallinus* occurs on a variety of lichens but is apparently rare in California (Kocourková et al. 2008). For a description see Diederich (1990).

Representative specimen. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 20.vii.2007, on *Teleoschistes chrysophthalmus, J. Kocourková & K. Knudsen s.n.* (PRM-909661).

90. *Merismatium decolorans* (Rehm ex Arnold) Triebel

NOTES. – *Merismatium decolorans* is a parasite on a variety of lichens and on algae. It is sometimes incorrectly presumed to be lichenized. For a description see Triebel (1989).

Representative specimen. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, 5.xii.2009, at base of *Cladonia nashii*, *J. Kocourková & K. Knudsen s.n.* (hb. myco. K.J. & K.K.)

91. *Microcalicium arenarium* (Hampe ex A. Massal.) Tibell

NOTES. – *Microcalicium arenarium* is a parasite on green algae and lichens (in Europe especially on *Psilolechia* species, which are rare in California). For a description see Tibell and Ryan (2004b) who reported it from California without citing any specimens.

92. *Microcalicium conversum* Tibell

NOTES. – *Microcalicium conversum* is a parasite on *Calicium viride* Pers. and *Chaenotheca subroscida* (Eitner) Zahlbr. For a description see Tibell and Ryan (2004b) who reported it from California without citing any specimens.

93. *Microcalicium disseminatum* (Ach.) Vain.

NOTES. – *Microcalicium disseminatum* infects a variety of lichens, turning the thallus brown with lesions. Reports of the species have been published by the several authors (Rikkinen 2003, Tucker 1997, Williams & Sillet 2007, Wright 1997). For a description see Tibell and Ryan (2004b) who reported it from California without citing any specimens.

94. *Minutoexcipula mariana* V. Atienza

NOTES. – *Minutoexcipula mariana* occurs on *Pertusaria* species and is probably common but overlooked in California (Diederich 2003, 2004g). For a description see Diederich (2004g).

Representative specimen. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Barbara, Hope Ranch, 24.x.1995, on *Pertusaria xanthodes*, *S.C. Tucker 34307* (SBBG, det. Diederich).

95. *Minutoexcipula tuckerae* V. Atienza & D. Hawksw.

NOTES. – *Minutoexcipula tuckerae* occurs on *Pertusaria* species. For a description see Diederich (2004g).

Representative specimen. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Barbara, Lotusland, 4.x.1996, on *Pertusaria lecanina*, *S.C. Tucker 34417* (SBBG, det. Diederich).

96. *Muellerella erratica* (A. Massal.) Hafellner & V. John

NOTES. – *Muellerella erratica* was previously treated as *M. pygmaea* var. *athallina* (Müll. Arg.) Triebel. It occurs on a wide variety of crustose lichens (Knudsen & Kocourková 2009a). For a description see Triebel and Kainz (2004) under the infraspecific name.

Representative specimens. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, Leo Carrillo State Park, Arroyo Sequit, 13.viii.2009, on *Lecanora subimmergens, J. Kocourková & K. Knudsen s.n.* (PRM-915678). MARIPOSA CO.: Yosemite National Park, 21.ix.2009, on *Caloplaca atroalba*, *J.C. Lendemer 19673A* (NY). RIVERSIDE CO.: San Jacinto Mountains, 2.x.2008, on *Lecanora polytropa*, *K. Knudsen 10351 & J.C. Lendemer* (UCR), on *Lecidea tessellata*, *J.C. Lendemer 14652A & K. Knudsen* (NY); Santa Ana Mountains, 15.xii.2011, on unknown host in soil crust, *K. Knudsen 14502 & M. Michalová* (UCR). SAN BERNARDINO CO.: San Bernardino Mountains, Cactus Flats, 7.x.2008, on *Lecanora polytropa, K. Knudsen 10416 & J.C. Lendemer* (UCR).SANTA CLARITA CO.: Mt. Hamilton, on *Lecidea*, *A.C.T.W. Herre s.n.* (NY).

97. *Muellerella lecanactidis* Diederich & van den Boom

NOTES. – *Muellerella lecanactidis* was mistakenly described as occurring on *Lecanactis* but the host was misidentified and the species actually occurs on *Sigridea californica* (Tuck.) Tehler (Knudsen & Kocourková 2009b). For a description see Triebel and Kainz (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN DIEGO CO.: Point Loma, 30.vii.2008, on *Sigridea californica, K. Knudsen 10008 & J. Kocourková* (M, UCR).

98. *Muellerella lichenicola* (Sommerf. ex Fr.) D. Hawksw.

NOTES. – *Muellerella lichenicola* occurs on a wide variety of lichens. For a description see Triebel and Kainz (2004).

Representative specimens. – **U.S.A. CALIFORNIA.** MONTEREY CO.: Point Lobos State Park, 14.v.2009, on *Lecanora demosthenesii, K. Knudsen 11134* (UCR), on *L. substrobilina, K. Knudsen 11122* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 2.i.1994, on *Lecanora* species, *T.H. Nash 32710* (ASU); 26.x.2008, on *Lecanora* species, *K. Knudsen 10615* (UCR).

99. *Muellerella ventosicola* (Mudd) D. Hawksw.

NOTES. – *Muellerella ventosicola* usually occurs on *Rhizocarpon* species in California (Knudsen et al. 2008a). For a description see Triebel and Kainz (2004).

Representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: San Jacinto Mountains, 2.x.2008, on *Rhizocarpon* species, *J.C. Lendemer 14690A & K. Knudsen* (NY). SAN DIEGO CO.: Cuyamaca Peak, 10.x.2007, on *R. bolanderi, K. Knudsen 9136* (UCR); Cuyamaca Mountains, 10.x.2007, on unknown host, *K. Knudsen 9092.2* (UCR).

100. *Neolamya xanthoparmeliae* Kocourk.

NOTES. – *Neolamya xanthoparmeliae* was recently described from *Xanthoparmelia* species in the Czech Republic (Kocourková 2009) where it is a common species. The only collection from Europe outside the Czech Republic is from Austria (F. Berger, *pers. comm.*). Currently it is also known from North America from a single specimen collected by Jana Kocourková in the San Jacinto Mountains which was exhausted during her study of the species. For a description see Kocourková (2009).

101. ***Nesolechia oxyspora*** **(Tul.) A. Massal.**

NOTES. – *Nesolechia oxyspora* is a heterogeneous species and occurs on a number of hosts (Doré et. al. 2006), Eventually it will be divided into several species. We use the broad concept of *Nesolechia oxyspora* in this paper. The taxon on *Xanthoparmelia* species is frequent in southern California, especially in the Mojave Desert. For a description see Peršol and Kainz (2004) where it is treated under the name *Phacopsis oxyspora* (Tul.) Triebel & Rambold with several varieties.

Selected representative specimens. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Anita Canyon, Hollister Ranch, 16.vii.1990, on *Hypotrachyna, C. Bratt 7184B* (SBBG, det. Diederich). RIVERSIDE CO.: San Jacinto Mountains, 23.vii.2007, on *Xanthoparmelia mexicana*, *J. Kocourková & K. Knudsen s.n.* (PRM-909670, UCR). SAN BERNARDINO CO.: Granite Mountains, 7.vi.2008, on *Xanthoparmelia* species, *K. Knudsen 9711* (UCR); Joshua Tree National Park, 6.xii.2010, on *Xanthoparmelia* species, *K. Knudsen 12837* (UCR). SHASTA CO.: Pollard Flat SW of Dunsmuir, 11.viii.2000, on *Parmelia sulcata*, *S.C. Tucker 37157B* (SBBG, det. Diederich). SONOMA CO.: Armstrong Woods State Park, 27.iii.1992, on *Platismatia herrei*, *S.C. Tucker 31759* (SBBG, det. Triebel).

102. ***Niesslia peltigericola*** **(D. Hawksw.) Etayo**

NOTES. – *Niesslia peltigericola* was collected on *Peltigera didactyla* (With.) J.R. Laundon growing near a stream at the base of a marble outcrop in Yosemite. See Lendemer et al. (2010) for description and photographs of ascospores and infection.

Representative specimen. – **U.S.A. CALIFORNIA.** MARIPOSA CO.: Yosemite National Park, 21.ix.2009, on *Peltigera didactyla*, *J.C. Lendemer 19680* (NY).

103. ***Nigropuncta rugulosa*** **D. Hawksw.**

NOTES. – *Nigropuncta rugulosa* was reported from California based on a Thiers collection from WIS made on *Sphaerosphorus tuckermanii* Räsänen (cited as *S. globosus* (Huds.) Vain.) in Alstrup and Cole (1998). For a description of the species see Hawksworth and Poelt (1986).

104. ***Obryzum corniculatum*** **Wallr.**

NOTES. – *Obryzum corniculatum* occurs on *Leptogium* species and was reported from Pinnacles National Monument in San Benito County (Diederich 2007). For a description see Diederich (2007).

105. ***Opegrapha anomea*** **Nyl.**

NOTES. – *Opegrapha anomea* occurs on *Pertusaria* species, especially *P. amara* (Ach.) Nyl. in California. For a description see Ertz and Egea (2007). All the specimens cited below occur on *P. amara*.

Representative specimens. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Catalina Island, 28.xii.1993, *T.H. Nash 32086* (ASU). MONTEREY CO.: Santa Lucia Mountains, Soda Springs, 12.v.2009, *K. Knudsen 11075* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Cruz Island, 6.viii.1983, *C. Bratt 3503* (SBBG); Santa Rosa Island, 1.i.1994, *T.H. Nash 32588* (ASU).

106. ***Opegrapha hellespontica*** **Vondrák & Kocourk.**

NOTES. – *Opegrapha hellespontica* was reported new for North America from the central California coast where it occurs on *Caloplaca luteominia* (Tuck.) Zahlbr., often in the spray zone (Kocourková & Knudsen 2009d). For a description see Vondrák and Kocourková (2008). All specimens cited below occurred on *C. luteominia*.

Selected representative specimens. – **U.S.A. CALIFORNIA.** MONTEREY CO.: Point Lobos State Reserve, 5.viii.2009, *K. Knudsen 11526 & J. Kocourková* (UCR); Santa Lucia Mountains, Limekiln State Park, 21.vii.2008, *K. Knudsen et al. 9981* (UCR). SAN LUIS OBISPO CO.: San Simeon State Park, San Simeon Bay, 15.viii.2008, *K. Knudsen 10130.1* (UCR).

107. ***Opegrapha pulvinata*** **Rehm**

NOTES. – *Opegrapha pulvinata* occurs on *Dermatocarpon* species. It was reported from Mt. Tamalpais State Park, near Highway 1 in Stinson Beach, Marin County, collected by the late Judy Robertson (Diederich 2003). For a description see Ertz and Egea (2007).

108. *Opegrapha sphaerophoricola* Isbrand & Alstrup

NOTES. – *Opegrapha sphaerophoricola* was reported from *Sphaerophorus tuckermanii* (host cited as *S. globosus*) from Mendocino County (Alstrup & Cole 1998). For a description see Isbrand and Alstrup (1992).

109. *Pezizella epithallina* (W. Philips & Plowr.) Sacc.

NOTES. – *Pezizella epithallina* grows on *Peltigera* species. See Lendemer et al. (2010) for an illustration and description.

Representative specimen. – **U.S.A. CALIFORNIA.** MARIPOSA CO.: Yosemite National Park, 21.ix.2009, on *Peltigera didactyla*, *J.C. Lendemer 19680-A* (NY).

110. *Phacopsis vulpina* Tul.

NOTES. – *Phacopsis vulpina* occurs on *Letharia* species. For a description see Peršol and Kainz (2004).

Representative specimens. – **U.S.A. CALIFORNIA.** EL DORADO CO.: American River Canyon near Kyburz, 12.viii.1975, on *Letharia vulpina*, *S.C. Tucker 14848* (SBBG, det. Diederich). SISKIYOU CO.: Mt. Shasta, *on L. vulpina,* 15.x.1995, *S.C. Tucker et al. 34113* (SBBG, det. Triebel), on *L. columbiana*, *S.C. Tucker 34113A* (SBBG, det Triebel).

111. *Phaeopyxis punctum* (A. Massal.) Rambold, Triebel & Coppins

NOTES. – *Phaeopyxis punctum* occurs on the thalline squamules of *Cladonia* species. It was reported from Humboldt County by Tucker and Ryan (2006). For a description see Diederich (2004h).

112. *Phaeosporobolus alpinus* R. Sant., Alstrup & D. Hawksw.

NOTES. – *Phaeosporobolus alpinus* occurs on *Ochrolechia* and *Pertusaria* species but has also been reported from a wide variety of unrelated lichens (Kocourková 2000); these collections may represent different undescribed species. The species was reported new for California by Knudsen and Kocourková (2009a). For a description see Alstrup and Hawksworth (1990).

Representative specimen. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, Leo Carrillo State Park, 14.viii.2009, on corticolous *Pertusaria* species, *J. Kocourková & K. Knudsen s.n.* (PRM-915670, UCR).

113. *Phaeosporobolus usneae* D. Hawksw. & Hafellner

NOTES. – *Phaeosporobolus usneae* occurs on a variety of mainly parmelioid fruticose corticolous lichens (Kocourková 2000). It is frequent in California (Diederich 2003). For a description see Diederich (2004i). All specimens cited below were determined by Diederich.

Representative specimens. – **U.S.A. CALIFORNIA.** ELDORADO CO.: around Saylor cabin on US Hwy 50 (S side) along American River, 15.x.1995, on *Letharia vulpina*, *S.C. Tucker 34113* (SBBG). LASSEN CO.: Cariboo Wilderness, 15.x.1991, on *L. vulpina*, *B. Corbin 48* (SBBG); MONTEREY CO.: Hastings Natural History Reservation, 20.i.1996, on *Ramalina menziesii* (apothecia), *Tucker 34509A* (SBBG). NEVADA CO.: Sierra Nevada Mountains, Tahoe National Forest, 1.vii.1990, on *L. vulpina*, *T.H. Nash 30976p.p.* (ASU, in *Lich. Exs. ASU 118* distributed as *Letharia vulpina*). SANTA BARBARA CO.: Channel Islands National Park, Santa Cruz Island, 30.i.1988, on *R. subleptocarpha*, *C. Bratt 5697* (SBBG). SANTA CRUZ CO.: along Skyline Boulevard, 13.iii.966, on *Usnea fulvoreagens*, *S.C. Tucker 6267D* (SBBG). SHASTA CO.: Thousand Lakes Wilderness, 17.x.1990, on *L. vulpina*, *B. Corbin 16* (SBBG).

114. *Phoma cladoniicola* Diederich, Kocourk. & Etayo

NOTES. – *Phoma cladoniicola* occurs on *Cladonia* species. For a description see Diederich et al. (2007).

Representative specimens. – **U.S.A. CALIFORNIA.** VENTURA CO.: Santa Monica Mountains, Thousand Oaks, 24.xi.2008, on *Cladonia chlorophaea*, *K. Knudsen et. al. 10707* (UCR); Channel Islands National Park, West Anacapa Island, 3.xii.2008, on *C. chlorophaea, K. Knudsen 10869* (PRM-911595, UCR).

115. ***Phoma physciicola* Keissl.**

NOTES. – *Phoma physciicola* is common on *Physcia* and *Physconia* species. For a description see Diederich (2004j).

Representative specimen. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Figueroa Mountain, 21.iii.1998, on *Physcia* species, *S.C. Tucker 35931* (SBBG, det. Diederich).

116. *Placocarpus americanus* K. Knudsen, Breuss & Kocourk.

NOTES. – *Placocarpus americanus* is a juvenile parasite on *Lecanora muralis* (Schreb.) Rabenh., developing an independent lichenized gray thallus. Although it was described from California it has also recently also been found in Arizona[4]. For a color illustration see Knudsen and Kocourková (2010b). For a description see Knudsen et al. (2009).

Representative specimens. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, Agoura, 12.i.2008, on *Lecanora muralis,* early stage of infection, *J.C. Lendemer 11461 & K. Knudsen* (NY, UCR). VENTURA CO.: Santa Monica Mountains, Conejo Open Space, 24.xi.2008, on *L. muralis* and independent on Conejo volcanics, *K. Knudsen et al. 10711* (LI, PRM-859105, UCR).

117. *Playcopyrenium noxium* Breuss

NOTES. – *Playcopyrenium noxium* is a juvenile parasite on *Staurothele* and *Aspicilia* species (Knudsen & Kocourková 2009a), eventually developing an independent lichenized gray thallus. It can only be confused with *Verrucaria bernardinensis* Breuss, with which it is sympatric at Cactus Flats in the San Bernardino Mountains (Knudsen 2005). It is currently known from three populations in California (Breuss 2009; Knudsen 2005; Knudsen & Kocourková 2009a, c). For description see Breuss (2002, 2009).

Selected representative specimens. – **U.S.A. CALIFORNIA.** ORANGE CO.: Santa Ana Mountains, Fremont Canyon, 31.xii.2007, on sandstone, *K. Knudsen 9421* (LI, UCR). SAN BERNARDINO CO.: San Bernardino Mountains, Cactus Flats, 20.xii.2004,on *Staurothele* species, *K. Knudsen 2089 & C. Wagner* (LI, UCR). VENTURA CO.: Santa Monica Mountains, on *Aspicilia* species, 28.v.2008, *K. Knudsen et al. 9656* (LI, UCR).

118. *Plectocarpon lichenum* (Sommerf.) D. Hawksw.

NOTES. – *Plectocarpon lichenum* occurs on *Lobaria* and *Pseudocyphellaria* species. It was reported from California based on a collection from Monterey County (Ertz et al. 2005). For a description see Ertz et al. (2005) and Ertz and Diederich (2007).

119. *Plectocarpon nashii* Hafellner

NOTES. – *Plectocarpon nashii* occurs on *Niebla robusta* (R. Howe) Rundel. It is only known from the type collection that was made on West Anacapa Island, where it is possibly extirpated (Hafellner et al. 2002, Knudsen & Kocourková 2010a). For a description see Ertz et al. (2005) and Ertz and Diederich (2007).

120. *Polycoccum kerneri* J. Steiner

NOTES. – *Polycoccum kerneri* occurs on *Lecidea fuscoatra* (L.) Ach. and *L. tessellata* Flörke (Hafellner et al. 2002, Kocourková 2000). It was reported new for California by Knudsen (2011). For a description see Calatayud (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** MARIPOSA CO.: Sierra National Forest, 24.iv.2011, on *Lecidea fuscoatra*, *K. Knudsen 13648* (UCR).

121. *Polycoccum microsticticum* (Leight. ex Mudd) Arnold

NOTES. – *Polycoccum microsticticum* is probably confined to *Acarospora* species but it has been reported from a variety of crustose lichens as was summarized in Kocourková (2000). It was reported from Orange County in Santesson (1986). For more notes see Triebel (1989).

Representative specimen. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Joshua Tree National Park, Covington Flats, 5.xi.2011**,** on *Acarospora* species, *J. Kocourková 8031 & K. Knudsen* (UCR).

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[4] **U.S.A. ARIZONA.** YAVAPAI CO.: Coconino National Forest, N-facing slopes of Cathedral Rock, 6.iii.2010, on *Lecanora muralis*, *J.C. Lendemer 21791* (NY), *J.C. Lendemer 21794* (NY).

122. *Polysporina arenacea* (H. Magn.) K. Knudsen & Kocourk.

NOTES. – *Polysporina arenacea* occurs on crustose lichens. For a description see Knudsen and Kocourková (2008b).

Selected representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Joshua Tree National Park, 19.xii.2010, on crustose lichens, *K. Knudsen 13181* (UCR). SAN BERNARDINO CO.: Granite Mountains, 14.xii.2006, on unknown host, *K. Knudsen 8055 & R. Muertter* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 15.viii.2007, on unknown host, *K. Knudsen 8762.2 & S. Werth* (UCR). SAN LUIS OBISPO CO.: San Simeon State Park, 8.i.2007, on unknown host, *K. Knudsen 8116* (UCR).

123. *Polysporina pusilla* (Anzi) M. Steiner ex Kantvilas

NOTES. – *Polysporina pusilla* is parasitic on algae and crustose lichens on limestone. For a description see Knudsen and Kocourková (2008b).

Representative specimen. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: San Jacinto Mountains, 29.x.2004, on *Caloplaca* species, *K. Knudsen 2012* (UCR).

124. *Polysporina subfuscescens* (Nyl.) K. Knudsen & Kocourk.

NOTES. – *Polysporina subfuscescens* is parasitic on crustose lichens and is the most common parasite in the Mojave Desert. There are 74 collections from California in the UCR Herbarium. *Polysporina bicolor* H. Magn. is a synonym of *P. subfuscescens*, and *P. lapponica* (Ach. ex Schaer.) Degel. is a name that has widely been misapplied to the taxon. *Polysporina subfuscescens* is pathogenic and does not develop an independent lichenized thallus. The misconception of it having a lichenized thallus is based on specimens collected in an early stage of infection, when the ascomata production of the host is suppressed, and the host is still in relatively good health with an intact algal layer but the apothecia of *P. subfuscescens* are abundant on the host. These specimens are favored by collectors, creating biases in herbarium specimens. In the western North America deserts, where *P. subfuscescens* is common, one can easily observe the whole life cycle, which culminates with the apothecia of *P. subfuscescens* atrophying from the mycelial remains of hosts. A truly lichenized species with *Polysporina* apothecia that begins as a juvenile parasite has not been discovered yet. If such a species were found, none of the existing names would apply for various reasons (Knudsen & Kocourková 2008b). For a description of *P. subfuscescens* see Knudsen and Kocourková (2008b).

125. *Protoparmelia ryaniana* van den Boom, Sipman & Elix

NOTES. – *Protoparmelia ryaniana* is a juvenile parasite on *Dimelaena radiata* and all the collections cited below occur on that host. For a description see van den Boom et al. (2007). The species is frequent on the Channel Islands (Knudsen & Kocourková 2009b, 2010a).

Selected representative specimens. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Cruz Island, 2.iv.2010, *K. Knudsen 12023* (UCR); Santa Rosa Island, 22.x.2008, *K. Knudsen et al. 10464* (UCR). SAN DIEGO CO.: Point Loma, 19.iv.2006, *K. Knudsen 5865 & R. Muertter* (UCR). SAN LUIS OBISPO CO.: San Simeon State Park, 12.v.2010, *K. Knudsen 12164* (UCR). VENTURA CO.: Channel Islands National Park, West Anacapa Island, 1.xii.2008, *K. Knudsen 10775* (UCR).

126. *Reconditella physconiarum* Matzer & Hafellner

NOTES. – *Reconditella physconiarum* occurs on *Physconia* species. For a description see Matzer and Hafellner (1990), or Lendemer et al. (2009a) for ascospore size.

Representative specimen. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Santa Ana Mountains, Santa Rosa Plateau, 11.iv.2007, on *Physconia isidiigera, J. Kocourková & K. Knudsen s.n.* (PRM-915343).

127. *Rhizocarpon dimelaenae* Timdal

NOTES. – *Rhizocarpon dimelaenae* is a juvenile parasite on *Dimelaena oreina*, developing an independent yellow lichenized thallus. It is a rare species described from a collection in the San Bernardino Mountains and a collection from the mountains of Arizona (Feuerer & Timdal 2004). It could not be relocated at the type locality but has been found at two new locations in southern California. For a description see Feuerer and Timdal (2004). Both specimens cited below were found on *D. oreina*.

Selected representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Santa Rosa Mountain, 18.vii.2009, *K. Knudsen et al. 11489* (UCR). SAN BERNARDINO CO.: San Bernardino Mountains, Gold Mountain, 25.viii.2011, *Knudsen et. al. 13670* (UCR).

128. *Rhizocarpon effiguratum* (Anzi) Th. Fr.

NOTES. – *Rhizocarpon effiguratum* is a juvenile parasite on *Pleopsidium flavum* (Bellardi) Körb., developing an independent yellow thallus. For a description see Feuerer and Timdal (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Santa Rosa Mountains, 18.vii.2009, on *Pleopsidium flavum, K. Knudsen et al. 11499* (UCR).

129. *Rhizocarpon pusillum* Runemark

NOTES. – *Rhizocarpon pusillum* is a juvenile parasite on *Sporastatia testudinea* (Ach.) A. Massal. Hertel (1975) cited a collection from Saddlebag Lake in Tuolumne County but the collector and herbarium were omitted. For a description see Feuerer and Timdal (2004).

130. *Rhizocarpon renneri* Poelt

NOTES. – *Rhizocarpon renneri* is a juvenile parasite on *Dimelaena oreina*, developing an independent gray lichenized thallus. For a description see Feuerer and Timdal (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** TUOLUMNE CO.: W of Sonora Pass Summit at Haigh Overlook on Hwy 108, 10.xi.1988, *C. Bratt & E. Timdal 6098* (SBBG).

131. *Rhizocarpon viridiatrum* (Wulfen) Körb.

NOTES. – *Rhizocarpon viridiatrum* is juvenile parasite on *Acarospora* and *Aspicilia* species, often developing a greenish-yellow independent lichenized thallus. It has a long history of being reported from California (Tucker & Ryan 2006). For a description see Feuerer and Timdal (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN BENITO CO.: San Benito Mountain, on *Aspicilia* species, 22.iv.2011, *K. Knudsen et al. 13633.2* (UCR).

132. *Rhymbocarpus boomii* Etayo & Diederich

NOTES. – *Rhymbocarpus boomii* occurs on *Dendrographa conformis* (Tehler) Ertz & Tehler (syn. *Roccellina conformis* Tehler) in California. It was reported by Diederich and Etayo (2004a) from the Channel Islands of southern California without citing a specimen. For a description see Diederich and Etayo (2004a).

133. *Rhymbocarpus cruciatus* (Sherwood, D. Hawksw. & Coppins) Etayo & Diederich

NOTES. – *Rhymbocarpus cruciatus* occurs on the thallus of *Diploicia canescens*. Diederich (2003) reported a collection from Point Lobos State Reserve in Monterey County.

Representative specimen. – **U.S.A. CALIFORNIA.** SAN DIEGO CO.: Point Loma, 30.vii.2008, *J. Kocourková 6917 & K. Knudsen* (hb. myco. J.K. & K.K.).

134. *Rimularia insularis* (Nyl.) Rambold & Hertel

NOTES. – *Rimularia insularis* is a juvenile parasite on members of the *Lecanora rupicola* group, forming an independent lichenized thallus. It has a long history of being reported from California and is particularly frequent in Marin County (Glacey et al. 2011, Tucker & Ryan 2006). For a description see Kainz and Rambold (2004).

Selected representative specimens. – **U.S.A. CALIFORNIA.** MARIN CO.: Mount Tamalpais State Park, Bolinas Ridge, 29.i.2006, on *Lecanora rupicola*, *J.C. Lendemer 5845* (NY, UCR), *K. Knudsen 5072* (UCR).

135. *Rinodina obnascens* (Nyl.) Oliv.

NOTES. – *Rinodina obnascens* is a parasite that especially occurs on *Aspicilia* species, developing an independent lichenized thallus. For a description and notes on its distribution see Sheard (2010).

Representative specimen. – **U.S.A. CALIFORNIA.** San Benito Co.: Moss Creek, 21.iv.2011, on cinnabar outcrop, *K. Knudsen et al. 13588* (UCR, det. Sheard).

136. *Rinodina parasitica* H. Mayrhofer & Poelt

NOTES. – *Rinodina parasitica* is a juvenile parasite on *Aspicilia* species, eventually developing an independent lichenized thallus. In California it is frequent in the Sierra Nevada Mountains. For descriptions see Sheard (2004b and 2010), the latter lists all known California collections.

Representative specimen. – **U.S.A. CALIFORNIA.** TUOLUMNE CO.: Stanislaus National Forest, 13.viii.1989, *B.D. Ryan 24493* (ASU, det. Sheard).

137. *Roselliniella cladoniae* (Anzi) Matzer & Hafellner

NOTES. – *Roselliniella cladoniae* occurs on *Cladonia* species and was reported from the California endemic *C. maritima* K. Knudsen & Lendemer from Santa Rosa Island (Kocourková et al. 2008). For descriptions of the species see Matzer and Hafellner (1990) or Kocourková et al. (2008).

Representative specimens. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 17.vii.2007, on *Cladonia maritima*, *J. Kocourková & K. Knudsen s.n.* (PRM-909680, UCR).

138. *Sarcogyne sphaerospora* J. Steiner

NOTES. – *Sarcogyne sphaerospora* is a lichenicolous fungus on *Candelariella* species. It looks like a *Polysporina* and has globose spores. See Lendemer et al. (2009) for a description and illustrations.

Representative specimen. – **U.S.A. CALIFORNIA.** SAN BERNARDINO CO.: San Bernardino Mountains, 7.x.2008, on *Candelariella rosulans, J.C. Lendemer 14917A & K. Knudsen* (NY).

139. *Sarcopyrenia bacillosa* (Nyl. ex Hasse) Nav.-Ros. & Hladun

NOTES. – *Sarcopyrenia bacillosa* is a California endemic that has usually been collected on *Acarospora socialis* and may also be parasitic on *Aspicilia* species (Knudsen & Lendemer 2006). For a description see Navarro-Rosinés and Hladun (2004).

Representative specimens. – **U.S.A. CALIFORNIA,** CONTRA COSTA CO.: Richmond, 27.i.2006, on *Acarospora socialis*, *K. Knudsen 5024 & J.C. Lendemer* (UCR). SAN DIEGO CO.: San Diego, 1.v.2009, on *A. socialis*, *K. Knudsen 10990* (UCR). VENTURA CO.: Santa Monica Mountains, 2.vi.2009, on *A. socialis*, *K. Knudsen 11240* (UCR).

140. *Sclerococcum montagnei* Hafellner

NOTES. – *Sclerococcum montagnei* occurs on *Lecanora rupicola* and is reported here as new for California. For a description see Diederich (2004k). All specimens cited below occur on *L. rupicola.*

Representative specimens. – **U.S.A. CALIFORNIA.** MARIPOSA CO.: Yosemite National Park, 22.ix.2009, *J.C. Lendemer 19746* (NY). RIVERSIDE CO.: San Jacinto Mountains, 6.x.2008, *J.C. Lendemer 14843 & K. Knudsen* (NY, UCR). SANTA CLARA CO.: Mt. Hamilton, 7.v.1932, *A.C.T.W. Herre s.n.* (NY).

141. *Sclerococcum parmeliae* Etayo & Diederich

NOTES. – *Sclerococcum parmeliae* occurs on a wide range of Parmeliaceae (Kocourková & Knudsen 2008). For a description see Etayo and Diederich (1996).

Representative specimen. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Santa Ana Mountains, Elsinore Peak, 12.iv.2007, on *Hypogymnia imshaugii*, *J. Kocourková & K. Knudsen s.n.* (PRM-909126).

142. *Skyttea pertusariicola* Diederich & Etayo

NOTES. – *Skyttea pertusariicola* occurs on *Pertusaria* species, especially those occuring on the Channel Islands. For a description see Diederich and Etayo (2004b).

Representative specimen. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 25.x.2008, on *Pertusaria flavicunda*, *K. Knudsen et al. 10580* (UCR).

143. *Skyttea tavaresiae* R. Sant., Etayo & Diederich

NOTES. – *Skyttea tavaresiae* grows on *Pyrrhospora quernea* (Dicks.) Körb. It occurs at least from Cambria north to Monterey as well as on San Miguel Island. It was named for late Isabelle Tavares who first collected it in Cambria. For a description see Diederich and Etayo (2004b).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN LUIS OBISPO CO.: San Simeon State Park, 13.viii.2008, on *Pyrrhospora quernea, K. Knudsen 10040.1* (UCR).

144. ***Skytella mulleri*** **(Willey) D. Hawksw. & R. Sant.**

NOTES. – *Skytella mulleri* occurs on *Peltigera* species. For a description see Hawksworth and Santesson (1988) who cited a specimen from San Jose collected by "Mrs. Bush" probably in 19th century (FH).

145. ***Sphaerellothecium abditum*** **Triebel**

NOTES. – *Sphaerellothecium abditum* occurs on *Immersaria* and *Lecidea* species. For a description see Cáceres and Triebel (2004).

Selected representative specimens. – **U.S.A. CALIFORNIA.** SAN BERNARDINO CO.: San Bernardino Mountains, 7.x.2008, on *Lecidea atrobrunnea, K. Knudsen 10408 & J.C. Lendemer* (UCR). SAN DIEGO CO.: Cuyamaca Peak, 10.x.2007, on *L. atrobrunnea, K. Knudsen 9135* (UCR).

146. ***Sphaerellothecium breussii*** **K. Knudsen, Kocourk. & Etayo**

NOTES. – *Sphaerellothecium breussii* occurs on *Placidium lacinulatum* (Ach.) Breuss. It is currently considered a California endemic. For a description and additional cited localities see Knudsen et al. (2008a).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN DIEGO CO.: UC Dawson Preserve, 21.xii.2005, on *Placidium lacinulatum*, *Knudsen et al. 4770.2* (UCR, holotype).

147. ***Sphaerellothecium cladoniae*** **(Alstrup & Zhurb.) Hafellner**

NOTES. – *Sphaerellothecium cladoniae* occurs on *Cladonia* species. For a description see Zhurbenko and Alstrup (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, Malibu, 22.xi.2009, on *Cladonia nashii, J. Kocourková 7342 & K. Knudsen* (hb. myco. J.K. & K.K.)

148. ***Sphaerellothecium parmeliae*** **Diederich & Etayo**

NOTES. – *Sphaerellothecium parmeliae* occurs on *Parmelia saxatilis* and *P. sulcata* Taylor. Diederich (2003) reported it for North America from a collection made by M. Cole on Mt. Tamalpais in Marin County. For a description see Cáceres and Triebel (2004).

149. ***Sphaerellothecium propinquellum*** **(Nyl.) Cl. Roux & Triebel**

NOTES. – *Sphaerellothecium propinquellum* usually occurs on the apothecia of members of the *Lecanora subcarpinea* group. Diederich (2003) reported a collection from Sequoia National Park. For a description see Cáceres and Triebel (2004).

150. ***Sphaerellothecium reticulatum*** **(Zopf) Etayo**

(syn. *Echinothecium reticulatum* Zopf)

NOTES. – *Sphaerellothecium reticulatum* occurs on species of *Parmelia* s. str. Currently this species is listed under the older name on the North American checklist (Esslinger 2011). For a brief description see Kocourková et al. (2008).

Representative specimen. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: San Jacinto Mountains, 28.vii.2008, on *Parmelia saxatilis, J. Kocourková & K. Knudsen s.n.* (UCR).

151. ***Sphinctrina anglica*** **Nyl.**

NOTES. – *Sphinctrina anglica* occurs on a variety of lichens, particularly *Protoparmelia* species. Tibell (2004) reported it from southern California where he collected, but did not cite a specimen. For a description of the species see Tibell (2004) or Ahti et al. (1999).

152. ***Sphinctrina leucopoda*** **Nyl.**

NOTES. – *Sphinctrina leucopoda* usually occurs on *Pertusaria* species, especially those growing on oaks, but also occasionally on saxicolous lichens usually in the understory. The species has frequently been reported from California (Tucker & Ryan 2006). For a description see Tibell (2004) or Ahti et al. (1999).

Selected representative specimens. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Cruz Island, 30.iii.2010, on unknown host on bark, *K. Knudsen 11921.2*

(UCR). VENTURA CO.: Santa Monica Mountains, Point Mugu State Park, 13.viii.2009, on *Lecanora gangaleoides*, *J. Kocourková & K. Knudsen s.n.* (PRM-915676).

153. *Sphinctrina tubaeformis* A. Massal.

NOTES. – *Sphinctrina tubaeformis* usually occurs on *Pertusaria* species with thin thalli on bark. Many of the reports from California probably need revision (Tucker & Ryan 2006). Tibell (2004) reported it from southern California without citing specimens. For a description of the species see Tibell (2004) or Ahti et al. (1999).

154. *Sphinctrina turbinata* (Pers.: Fr.) De Not.

NOTES. – *Sphinctrina turbinata* usually occurs on *Pertusaria* species on bark, but like other *Sphinctrina* species is occasionally found on other lichen genera especially on associated rocks in the understory. The species was report by Hasse (1915) as occurring on *Thelomma mammosum* (Hepp ex Hartung) A. Massal. That report is accurate and has been verified (Knudsen & Kocourková 2010b, Tibell 2004). For a description see Tibell (2004) or Ahti et al. (1999).

Selected representative specimens. – **U.S.A. CALIFORNIA.** MARIN CO.: Mount Tamalpais State Park, 29.i.2006, on thallus of *Lecanora bicincta, J.C. Lendemer 5854 & K. Knudsen* (UCR). SAN DIEGO CO.: Point Loma, 1.v.2007, on *Pertusaria xanthodes* on sandstone, *K. Knudsen 8320 & A. Compton* (UCR). VENTURA CO.: Santa Monica Mountains, 12.i.2008, on *L. muralis, J.C. Lendemer 11440 & K. Knudsen* (NY, UCR).

155. *Stigmidium californicum* K. Knudsen & Kocourk.

NOTES. – *Stigmidium californicum* occurs on the apothecia of two corticolous *Caloplaca* species, *C. stipitata* Wetmore and *C. stanfordensis* H. Magn. In California it is only known from the Channel Islands. For a description see Knudsen and Kocourková (2010d).

Selected representative specimens. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 19.x.2006, on apothecia of *Caloplaca stipitata, K. Knudsen* 7794.2 (UCR). VENTURA CO.: Channel Islands National Park, East Anacapa Island, 23.v.2009, on *C. stanfordensis*, *K. Knudsen 11145* (M, UCR, hb. Diederich).

156. *Stigmidium epistigmellum* (Nyl. ex Vouaux) Kocourk. & K. Knudsen

NOTES. – In southern California, especially on the Channel Islands, *Stigmidium epistigmellum* is common on maritime *Caloplaca* species, usually *C. luteominia*. The holotype was collected by Hasse in the Santa Monica Mountains. For additional locations and a description see Kocourková and Knudsen (2009c).

Selected representative specimens. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 16.viii.2007, on *Caloplaca luteominia, K. Knudsen et al. 8795* (FH, H, M, PRM-910296, SBBG, UCR, UPS, hb. Diederich); above tributary of Water Canyon, below Wreck Road, 19.vii.2007, on *C. luteominia, J. Kocourková & K. Knudsen s.n.* (PRM-909266). SAN BENITO CO.: Clear Creek, 21.iv.2011, on *Caloplaca* species, *K. Knudsen et al. 13586.1* (UCR). SAN LUIS OBISPO CO.: San Simeon State Park, 15.viii.2008, on *C. luteominia, K. Knudsen 10133* (NY, UCR).

157. *Stigmidium epixanthum* Hafellner

NOTES. – In southern California *Stigmidium epixanthum* is widespread and frequent on *Acarospora socialis*. For a description see Hafellner et al. (2002) and Triebel and Cáceres (2004). All specimens cited below are from *A. socialis.*

Selected representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Wildomar, Menifee Hills, 14.x.2009, *K. Knudsen 11780* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 18.vii.2007, *K. Knudsen 8618.1 & J. Kocourková* (UCR). SAN DIEGO CO.: Anza-Borrego Desert State Park, 15.iii.2008, *K. Knudsen et al. 9545.2* (UCR).

158. *Stigmidium fuscatae* (Arnold) R. Sant.

NOTES. – *Stigmidium fuscatae* is only known in Califonia from Yosemite where it was found growing on *Acarospora fuscata* (Ach.) Th. Fr. The species is common in eastern North America where it is only known from *A. fuscata*. For a description of *S. fuscatae* see Triebel and Cáceres (2004).

Selected representative specimens. – **U.S.A. CALIFORNIA.** MARIPOSA CO.: Yosemite National Park, 19.9.2009. on small reduced thallus of *Acarospora fuscata, K. Knudsen 11637* (YOSM).

159. *Stigmidium hesperium* Kocourk., K. Knudsen & Diederich

NOTES. – *Stigmidium hesperium* occurs on maritime *Caloplaca,* particularly *C. coralloides* (Tuck.) Hult., along the California coast in Monterey County and on Santa Rosa Island. For a description see Kocourková and Knudsen (2009d).

Representative specimen. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 13.vi.2009, on *C. coralloides, K. Knudsen 11375* (UCR).

160. *Stigmidium lendemeri* Kocourk. & K. Knudsen

NOTES. – *Stigmidium lendemeri* occurs on a variety of *Aspicilia* species across North America. For a description see Kocourková and Knudsen (in press).

Representative specimen. – **U.S.A. CALIFORNIA.** MARIPOSA CO.: Yosemite National Park, along Merced River, 20.ix.2009, on *Aspicilia* species, *K. Knudsen 11680* (UCR).

161. *Stigmidium psorae* (Anzi) Hafellner

NOTES. – *Stigmidium psorae* usually occurs on *Psora crenata* (Taylor) Reinke, which is relatively rare in California based on current reports (Tucker & Ryan 2006). For a description see Triebel and Cáceres (2004).

Representative specimens. – **U.S.A. CALIFORNIA.** SAN DIEGO CO.: Anza-Borrego Desert State Park, No Return Canyon, 27.iv.2006, on *Psora crenata*, *K. Knudsen 5875 & R. Muertter* (UCR, hb. Etayo); NE of Palms Wash, 7.iii.2008, on *P. crenata*, *K. Knudsen et al. 9531* (UCR).

162. *Stigmidium pumilum* (Lett.) Matzer & Hafellner

NOTES. – *Stigmidium pumilum* occurs on *Physcia* species and appears to be rare in California (Etayo et al. 2007). For a description see Triebel and Cáceres (2004).

Representative specimens. – **U.S.A. CALIFORNIA.** SAN LUIS OBISPO CO.: Estero Bluffs State Park, 16.xii.2005, on *Physcia tribacia* and *P. dimidiata*, *K. Knudsen et al. 4640* (UCR, hb. Etayo). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 20.vii.2007, on *P. phaea*, *J. Kocourková & K. Knudsen s.n.* (PRM-909121).

163. *Stigmidium ramalinae* (Müll. Arg.) Etayo & Diederich

NOTES. – *Stigmidium ramalinae* occurs on *Ramalina* species. For a minimal description see Kocourková et al. (2010).

Representative specimen. – **U.S.A. CALIFORNIA.** VENTURA CO.: Santa Monica Mountains, Point Mugu State Park, 13.vii.2009, on *Ramalina subleptocarpha, J. Kocourková 7342 & K. Knudsen* (hb. myco. J.K. & K.K.).

164. *Stigmidium squamariae* (B. de Lesd.) Cl. Roux & Triebel

NOTES. – *Stigmidium squamariae* occurs in California especially on *Lecanora muralis* and is frequent in region (Knudsen & Kramer 2007, Knudsen et al. 2008a, Kocourková & Knudsen 2009c). For a description see Triebel and Cáceres (2004). All the specimens cited below were collected on *L. muralis.*

Selected representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Joshua Tree National Park, Lost Horse Mountains, 9.xii.2010, *K. Knudsen 12941* (UCR). SAN LUIS OBISPO CO.: San Simeon State Park, 9.i.2007, *K. Knudsen 8149* (UCR), *K. Knudsen 8150* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 22.x.2008, *K. Knudsen 10451* (UCR). SAN BERNARDINO CO.: Joshua Tree National Park, 13.iv.2011, *K. Knudsen 13552* (UCR).

165. *Stigmidium tabacinae* (Arnold) Triebel

NOTES. – *Stigmidium tabacinae* occurs on members of the genus *Toninia*. For a description see Triebel and Cáceres (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN BERNARDINO CO.: Granite Mountains, 3.xii.2005, on *Toninia tristis*, *K. Knudsen 4479 & S. Werth* (UCR, hb. Etayo; det. Etayo).

166. *Stigmidium xanthoparmeliarum* Hafellner

NOTES. – *Stigmidium xanthoparmeliarum* occurs on *Xanthoparmelia* species (Knudsen & Kocourková 2009c, Kocourková & Knudsen 2008). For a description and line art illustration see Hafellner (1994).

Representative specimens. – **U.S.A. CALIFORNIA.** ORANGE CO.: Santa Ana Mountains, Fremont Canyon, 5.xii.2007, on *Xanthoparmelia* species, *K. Knudsen 9299* (UCR). RIVERSIDE CO.: Santa Ana Mountains, Elsinore Peak, 12.iv.2007, on *X. mexicana*, *J. Kocourková & K. Knudsen s.n.* (PRM-909651). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 18.vii.2007, on *Xanthoparmelia* species, *J. Kocourková & K. Knudsen s.n.* (PRM-909688).

167. *Syzygospora bachmanii* Diederich & M.S. Christ.

NOTES. – *Syzygospora bachmanii* occurs on *Cladonia* species and was recently reported new for California by Ahti (*in* Glacey et al. 2011). For a description see Diederich (1996).

Representative specimen. – **U.S.A. CALIFORNIA.** MARIN CO.: Point Reyes National Seashore, 12.vii.2008, on *Cladonia artuata, T. Ahti 69211* (H).

168. *Syzygospora physciacearum* Diederich

NOTES. – *Syzygospora physciacearum* occurs on *Hetereodermia, Physcia*, and *Physconia* species and has been reported many times from California (Diederich 2003, 2004l; Knudsen & Kocourková 2009a, 2010a; Tucker & Ryan 2006). Diederich stated it does not occur on *Hetereodermia erinacea* (Ach.) W. A. Weber in California, but we have confirmed that it does occur on that host in Santa Cruz County (Diederich 2003, 2004l). For descriptions see Diederich (1996) and Diederich (2004l).

Selected representative specimens. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, Leo Carrillo State Park, 14.viii.2009, on *Physcia dimidiata*, *J. Kocourková & K. Knudsen s.n.* (PRM-915675, UCR); 14.viii.2009, Rocky Oaks, on *Physcia adscendens*, *J. Kocourková & K. Knudsen s.n.* (UCR). MARIPOSA CO.: 20.ix.2009, Yosemite National Park, on *Physconia* species, *J.C. Lendemer 19666* (NY). RIVERSIDE CO.: San Jacinto Mountains, 11.vi.2008, on *Physconia californica*, *J.C. Lendemer 11498 & K. Knudsen* (NY). SAN DIEGO CO.: Laguna Mountains, 24.vi.2004, on *Physconia*, *J.C. Lendemer 2724 & K. Knudsen* (NY). SANTA CRUZ CO.: Castle Rock, 29.xii.1972, on *Hetereodermia erinacea*, *S.C. Tucker 10988* (SBBG, det. Tucker), 20.i.1996, on *H. erinacea*, *S.C. Tucker 34366* (SBBG, det. Tucker). VENTURA CO.: Channel Islands National Park, West Anacapa Island, 2.xii.2008, on *Physcia* species, *K. Knudsen 10831* (UCR), 9.xi.1995, on *Physcia* species, *T.H. Nash 37119* (ASU).

169. *Taeniolella phaeophysciae* D. Hawksw.

NOTES. – *Taeniolella phaeophysciae* occurs on the thallus on *Phaeophyscia orbicularis* (Necker) Moberg. For a description see Diederich (2004m).

Representative specimens. – **U.S.A. CALIFORNIA.** LAKE CO.: Clear Lake State Park, 27.iii.1992, on *Phaeophyscia* cf. *orbicularis*, *S.C. Tucker 31712* (SBBG, det. Hawksworth). SAN LUIS OBISPO CO.: Santa Margarita Lake Recreation Area, 28.xii.1996, on *P. orbicularis*, *S.C. Tucker 35125* (SBBG, det. Diederich).

170. *Thelocarpon lichenicola* (Fuckel) Poelt & Hafellner

NOTES. – *Thelocarpon lichenicola* occurs on a variety of lichens throughout its range as well as on sandstone, soil, and wood. Though they are hardy pioneer species, *Thelocarpon* species are apparently rare in southern California, probably because of lower general humidity. For a description see Knudsen and Lumbsch (2007).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN DIEGO CO.: Palomar Mountain, 20.iv.2005, scant on thallus and apothecia of *Lecanora* species with *Vouauxiella lichenicola, K. Knudsen 2710 & L. Glacy* (F, UCR).

171. *Toninia subdispersa* (Nyl. ex Hasse) K. Knudsen

(Syn. *Toninia talparum* Timdal)

NOTES. – *Toninia subdispersa* is a lichenicolous fungus that is common on a variety of *Lecania* species, especially on the Channel Islands (Knudsen 2008, 2009; Knudsen & Kocourková 2009c, 2010a; Knudsen & Lendemer 2007). For a description see Timdal (2002) under the name *T. talparum*.

Selected representative specimens. – **U.S.A. CALIFORNIA.** MONTEREY CO.: Pacific Valley, 12.v.2009, on *Lecania hassei, K. Knudsen 11038*.2 (UCR). RIVERSIDE CO.: Bautista Canyon, 15.iv.2007, on *L. brunonis*, *K.Knudsen 8294 & J. Kocourková* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 27.x.2008, on *L. hassei*, *K. Knudsen 10633* (NY, UCR).

172. *Toninia subtalparum* van den Boom

NOTES. – *Toninia subtalparum* is a lichenicolous fungus that occurs on *Lecania dudleyi* Herre. One should be careful because *T. subdispersa* also occurs on *L. dudleyi*. For a description see van den Boom (2004).

Representative specimen. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 18.x.2006, on *Lecania dudleyi*, *K. Knudsen 7741* (UCR), 25.x.2008, *K. Knudsen 10554* (UCR).

173. *Tremella dendrographae* Diederich & Tehler

NOTES. – *Tremella dendrographae* is common along the California coast where it occurs on *Dendographia* species (Diederich 1996, 2003, 2004n). For locations see Diederich (2003). For a description see Diederich (1996, 2004n).

174. *Tremella lethariae* Diederich

NOTES. – *Tremella lethariae* grows on *Letharia* species. For a description see Diederich (2003, 2004n). In Diederich (2004n) a single California specimen was reported from Sequoia National Park in Tulare County.

Representative specimen. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Santa Rosa Mountain, 18.vii.2009, on *Letharia vulpina, K. Knudsen et al. 11480* (UCR).

175. *Tremella nieblae* Diederich & van den Boom

NOTES. – *Tremella nieblae* is common along the central and northern coast of California where it occurs on *Niebla* species. For a description see Diederich (2007).

Representative specimen. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Channel Islands National Park, Santa Rosa Island, 20.x.2006, on *Niebla cephalota, K. Knudsen 7837* (UCR).

176. *Tremella parmeliarum* Diederich

NOTES. – *Tremella parmeliarum* occurs on *Parmotrema* species in California (Diederich 2003, Knudsen & Kocourková 2010a). For descriptions see Diederich (2003, 2004n).

Representative specimens. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Montecito, 4.i.1996, on *Parmotrema hypoleucinum*, *S.C. Tucker 34441* (SBBG, UCR; det. Diederich,); Channel Islands National Park, Santa Rosa Island, 15.x.2006, on *Parmotrema* species, *K. Knudsen 7504.5* (UCR). VENTURA CO.: Channel Islands National Park, West Anacapa Island, 9.xi.1995, on *P. hypoleucinum, S. Chaney 9258* (SBBG [reported as a C. Bratt collection in Diederich (2003), but likely a specimen collected by Chaney and given to Bratt.])

177. *Tremella phaeophysciae* Diederich & M.S. Christ.

NOTES. – *Tremella phaeophysciae* occurs on *Phaeophyscia* species. For a description and for information detailing how to separate it from *Syzygospora physciacearum* see Diederich (2004n).

Representative specimen. – **U.S.A. CALIFORNIA.** LAKE CO.: Clear Lake, 27.iii1992, on *Phaeophyscia orbicularis*, *S.C. Tucker 31712* (SBBG, det. Diederich).

178. *Tremella ramalinae* Diederich

NOTES. – *Tremella ramalinae* occurs on *Ramalina* species. For descriptions see Diederich (1996, 2004n).

Representative specimens. – **U.S.A. CALIFORNIA.** MONTEREY CO.: Santa Lucia Mountains, Lime Kiln State Park, 4.ix.2008, on *Ramalina* species, *K. Knudsen 10210* (UCR). SANTA BARBARA CO.: Channel Islands National Park, Santa Cruz Island, 23.ix.1997, on *R. pollinaria, S.C. Tucker 35762B* (SBBG, det. Diederich).

179. *Trimmatostroma dendrographae* Diederich, Ertz, U. Braun & Heuchert

NOTES. – *Trimmatostroma dendrographae* occurs on *Denderographa* species as well as on *Paraschismatomma ochroleucum* (Zahlbr.) K. Knudsen, Ertz & Tehler (based on on the isotype at NY seen by Knudsen). See Diederich et al. (2010) for a description and illustrations of this common pathogenic fungus of the central coast of California.

Representative specimen. – MONTEREY CO.: Point Lobos State Reserve, on *Dendrographa*, *P. Diederich 16789* & *D. Ertz* (BR, HAL, NY, UCR, hb. Diederich).

180. *Unguiculariopsis lettaui* (Grummann) Coppins

NOTES. – *Unguiculariopsis lettaui* occurs on *Evernia prunastri.* For a description see Diederich and Etayo (2000). The report below from the IAL field trip (Kocourková et al. 2009) was not included in Glacy et al. (2011) as occurring at Point Reyes.

Representative specimen. – **U.S.A. CALIFORNIA.** MARIN CO.: Point Reyes National Seashore, 10.vii.2008, IAL Symposium fieldtrip, on *Evernia punastri*, *J. Kocourková & K. Knudsen s.n.* (PRM-915120).

181. *Unguiculariopsis thallophila* (P. Karst.) W. Y. Zhuang

NOTES. – *Unguiculariopsis thallophila* occurs on *Lecanora* species. It appears to be rare in California (Etayo et al. 2007). For a description see Diederich and Etayo (2000).

Representative specimen. – **U.S.A. CALIFORNIA.** SAN BERNARDINO CO.: San Bernardino Mountains, 20.xii.2004, on *Lecanora subrugosa* with *Vouauxiella lichenicola, K. Knudsen 2073 & C.L. Wagner* (UCR, hb. Etayo; det. Etayo).

182. *Verrucaria bernardinensis* Breuss

NOTES. – *Verrucaria bernardinensis* is a juvenile parasite on *Staurothele areolata* (Ach.) Lettau., *S. drummondii* (Tuck.) Tuck., and *S. monicae* (Zahlbr.) Wetmore, eventually developing an independent lichenized gray pruinose thallus. It may occur on other genera. For a description see Breuss (2007).

Selected representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Joshua Tree National Park, 24.xii.2010, morphing out of on unknown host, *K. Knudsen 13294.1* (UCR). SAN BERNARDINO CO.: Granite Mountains, 6.vi.2008, on *Staurothele monicae*, *Knudsen 9681* (UCR).

183. *Verrucaria cetera* Breuss

NOTES. – *Verrucaria cetera* is a juvenile parasite usually occurring on *Staurothele* species and developing an independent pruinose gray brown thallus. For a description see Breuss (2007).

Representative specimen. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Channel Islands National Parks, San Miguel Island, 18.iii.1998, on rock, *T.H. Nash 41414* (ASU, det. Breuss).

184. *Verrucaria compacta* (A. Massal.) Jatta

NOTES. – This is a common desert species in California, especially in the Mojave. It is often found growing among lichens. We do not believe it is an obligatory parasite but we have deposited one large specimen at NY of it morphing out of *Acarospora socialis* (Fig. 1). A second collection was recently made with the same behavior in the Sonoran Desert zone of Joshua Tree National Park. For a description see Breuss (2007).

Selected representative specimens. – **U.S.A. CALIFORNIA.** SAN BERNARDINO CO.: Joshua Tree National Park, Cottonwood Mountains, 8.xii.2011, on *A. socialis, K. Knudsen 14451.1 & M. Michalová* (UCR). SAN DIEGO CO.: Anza-Borrego Desert State Park, 23.xii.2005, on *A. socialis, K. Knudsen et al. 4811* (NY, UCR).

185. *Vouauxiella lichenicola* (Linds.) Petr. & Syd.

NOTES. – *Vouauxiella lichenicola* occurs on *Lecanora* species and is frequent in California. See Diederich (2003) for citations of many California collections. For a description see Diederich (2004o).

Selected representative specimens. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, 14.viii.2009, on *Lecanora circumborealis*, *J. Kocourková & K. Knudsen s.n.* (PRM-915674). RIVERSIDE CO.: San Jacinto Mountains, 10.viii.2006, on *Lecanora* species, *K. Knudsen 7066* (UCR).

186. *Weddellomyces xanthoparmeliae* Calat. & Nav.-Ros.

NOTES. – *Weddellomyces xanthoparmeliae* occurs on *Xanthoparmelia* species (Knudsen & Kocourková 2010b, Kocourková & Knudsen 2008). For a description see Calatayud and Navarro-Rosinés (1998).

Selected representative specimens. – **U.S.A. CALIFORNIA.** LOS ANGELES CO.: Santa Monica Mountains, 22.xi.2009, on *Xanthoparmelia* species, *J. Kocourková & K. Knudsen s.n.* (hb. myco. J.K. &

K.K.) RIVERSIDE CO.: San Jacinto Mountains, 16.iv.2007, on *X. mexicana*, *J. Kocourková & K. Knudsen s.n.* (PRM-909656, UCR).

187. *Zwackhiomyces coepulonus* (Norm.) Grube & R. Sant.

NOTES. – *Zwackhiomyces coepulonus* occurs on *Caloplaca* species and *Xanthoria elegans*. For a key to the genus and species see Calatayud et al. (2007).

Representative specimens. – **U.S.A. CALIFORNIA.** RIVERSIDE CO.: Santa Ana Mountains, Santa Rosa Plateau, 11.iv.2007, on *Caloplaca persimilis*, *J. Kocourková & K. Knudsen s.n.* (PRM-909117). SAN BERNARDINO CO.: San Bernardino Mountains, Cactus Flats, 16.ix.2004, on *Xanthoria elegans*, *K. Knudsen et al. 1685* (UCR); Mojave National Preserve, Clark Mountains, 11.x.2009, on *X. elegans*, *K. Knudsen 11771 & N. Pietrasiak* (UCR). VENTURA CO.: Simi Hills, 1.vi.2009, on *Caloplaca biatorina, K. Knudsen 11174* (UCR).

EXCLUDED SPECIES

1. *Acarospora obnubila* H. Magn.

NOTES. – This brown species was described from Arizona and is common in southern California where it is often found growing among other lichens. It was considered a juvenile parasite on *Aspicilia* species and probably other crustose lichens (Knudsen 2007). But using a stricter definition of what constitutes a lichenicolous lichen (see Methods), among 61 specimens in the UCR Herbarium we found no specimen of *A. obnubila* that showed definitive proof it was a juvenile parasite. It is definitely a competitive and late successional species in saxicolous lichen communities.

2. *Acarospora strigata* (Nyl.) Jatta

NOTES. – This common desert species has been reported as a lichenicolous lichen, a juvenile parasite on *Aspicilia* developing an independent lichenized thallus (Lawrey & Diederich 2011). In studying this species in western North America and South America we have seen no evidence that this is a lichenicolous taxon. It is a pioneer species and is occasionally found growing among other lichens where it is a vigorous competitor for space.

3. *Adelococcus alpestris* (Zopf) Theissen & Syd.

NOTES. – The report in Tucker and Ryan (2006) could not be verified because the specimen was missing from SBBG and there is no record who annotated the specimen.

Missing specimen. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Lion's Head, Vandenberg Air Force Base, 12.viii.1987, on *Acarospora* species, *C. Bratt 5586* (SBBG).

4. *Dactylospora inquilina* (Tuck.) Hafellner

NOTES. – Hasse (1915) stated *"Buellia inquilina* Tuck. On thallus of *Lecanora saxicola*, which is darkened and dull brownish colored. Apothecia flat, 0.3 to 0.5 mm wide. Sp. 12-16 µm long, 7-8 µm thick; hymenium gelatina with iodine blue, the asci dark coppery-red. Eden Hot Springs*"*. This report is on the wrong host, *Lecanora muralis*, and needs to be investigated. Unfortunately the specimen was not located at FH and is presumed lost.

5. *Chaenothecopsis viridialba* (Kremp.) A.F.W. Schmidt

NOTES. – *Chaenothecopsis viridialba* (Kremp.) A.F.W. Schmidt is sometimes reported overgrowing *Chaenotheca chrysocephala* (Ach.) Th. Fr. (Ahti et al. 1999) but Peterson and Rikkinen (1999) reported California specimens as only saprobic on wood. At higher latitudes like the Czech Republic, *C. viridialba* grows on *C. chrysocephala* (Kocourková 2000).

6. *Heterocarpon ochroleucum* (Tuck.) Müll. Arg.

(Syn. *Endocarpon ochroleucum* Tuck. *fide* Tuckerman (1872, 1888).

NOTES. –This is a lichenicolous perithecioid fungus on an unidentified host thallus. The type specimen at FH is in poor condition, according to Diederich (*pers. comm.* to Nash).

7. *Rinodina milvina* (Wahlenb.) Th. Fr.

NOTES. – In Sheard (2010), *Rinodina milvina* keys out under lichenicolous species and it occurs in California. While it is often found growing on top of other lichens, *R. milvina* probably is not a lichenicolous lichen as defined herein (Sheard, *pers. comm.*) More observations are needed.

8. *Toninia*

NOTES. – Timdal lists many lichenized *Toninia* species in California as lichenicolous lichens, usually on cyanolichens (Timdal 2002). We exclude these from the list at this time. As with *Acarospora obnubila* above, *Toninia* species are sometimes found growing among other lichens or over them. But we have seen no specimens where the lichenized *Toninia* is actually growing out of a lichen (morphing) as in the case with the lichenicolous lichens included in the list above. Nonetheless specimens proving the existence of a juvenile parasitic phase are to be sought. Voucher material of *T. verrucarioides* (Nyl.) Timdal, a probable lichenicolous lichen on *Placynthium* species, reported by Wright and Bratt (1995), could not be located in SBBG.

HOST INDEX

NOTES. – Species with a wide host range such as *Lichenoconium erodens* are not recorded on all their possible hosts. Any lichenicolous fungus listed under a genus could possibly occur on many species in the genus and should be eliminated when making a determination, even when a host or group of hosts is specified in parenthesis after the species. For instance, we have only collected *Stigmidium epixanthum* on yellow *Acarospora.* Nonetheless, although we do not think it likely occurs on *Acarospora* species that lack rhizocarpic acid, we always eliminate it when identifying any *Stigmidium* collected on brown *Acarospora* species.

Acarospora* species:** *Acaroconium punctiforme, Adelococcus alpestris, Buellia badia, Caloplaca epithallina, Endococcus stigma, Lichenostigma anatolicum, Lichenostigma subradians, Lichenostigma saxicola, Llimoniella acarosporicola, Placopyrenium noxium, Polycoccum microsticticum, Polysporina subfuscescens, Rhizocarpon viridiatrum, Sarcopyrenia bacillosa, Stigmidium epixanthum* (yellow *Acarospora*), *Stigmidium fuscatae* **(Acarospora fuscata***),** *Verrucaria compacta*

***Aspicilia* species:** *Buellia badia, Caloplaca epithallina, Lichenochora verrucicola, Lichenostigma elongatum, Lichenostigma radicans, Lichenothelia convexa, Lichenothelia scopularia, Polysporina subfuscescens, Rhizocarpon viridiatrum, Rinodina obnascens, R. parasítica, Sarcopyrenia bacillosa, Stigmidium lendermeri*

***Buellia* species:** *Endococcus matzeri, Lichenostigma amplum*

***Caloplaca* species:** *Arthonia molendoi*, *Buelliella inops*, *Cercidospora caudata, Intralichen baccisporus*, *Lecania caloplacicola, Lichenodiplis lecanorae, Lichenostigma bolacinae* (*Caloplaca bolacina*), *Opegrapha hellespontica* (spray zone *Caloplaca* species), *Polysporina pusilla, Polysporina subfuscescens, Stigmidium californicum* (corticolous *Caloplaca* species), *Stigmidium epistigmellum* (maritime saxicolous species), *Stigmidium hesperium* (maritime *Caloplaca* species), *Zwackhiomyces coepulonus*

***Candelaria pacifica*:** *Athelia arachnoidea*

***Candelariella* species:** *Carbonea vitellinaria, Polysporina subfuscescens, Sarcogyne sphaerospora*

***Cavernularia lophyrea*:** *Abrothallus prodiens*

***Chaenothecia trichialis*:** *Chaenothecopsis epithallina*

***Cladonia* species:** *Arthrorhaphis aeruginosa, Briancoppinsia cytospora, Cercidospora cladoniicola, Diploschistes muscorum, Lichenoconium erodens, Merismatium decolorans, Phaeopyxis punctum, Phoma cladonicola, Roselliniella cladoniae, Sphaerellothecium cladoniae, Syzygospora bachmanii*

***Dimelaena oreina*:** *Endococcus oreinae, Rhizocarpon dimelaenae*, *Rhizocarpon renneri*

***Dimelaena radiata*:** *Endococcus matzeri, Dimelaena californica, Protoparmelia ryaniana*

Dimelaena thysanota: *Endococcus oreinae*

Diploicia canescens: *Arthonia diploiciae, Rhymbocarpus cruciatus*

***Dendographa* species:** *Lichenodiplis dendrographae, Tremella dendrographae, Trimmatostroma dendrographae*

Dendrographa conformis: *Rhymbocarpus boomii*
***Dermatocarpon* species:** *Opegrapha pulvinata*
Evernia prunastri: *Cornutispora ciliata, Lichenoconium erodens, Unguiculariopsis lettaui*
Flavoparmelia caperata: *Abrothallus microspermus, Briancoppinsia cytospora, Vouauxiomyces truncatus*
Flavopunctelia flaventior: *Briancoppinsia cytospora, Lichenoconium erodens,*
***Heterodermia* species:** *Syzygospora physciacearum*
***Hypocenomyce* species:** *Clypeococcum hypocenomycis*
***Hypogymnia* species:** *Abrothallus prodiens, Cystobasidium hypogymnicola, Lichenoconium erodens, Phoma cytospora, Phaeosporobolus usneae, Sclerococcum parmeliae*
Lecanographa hypothallina: *Arthonia infectans*
***Lecanographa* species:** *Arthonia infectans*
***Lecania* species:** *Dacampia lecaniae* (*Lecania fuscella*), *Echinodiscus lesdainii, Lecania caloplacicola, Toninia subdispersa, Toninia subtalparum* (*Lecania dudleyi*)
***Lecanora* species:** *Arthonia clemens, Arthonia varians* (*L. rupicola* group), *Cercidospora macrospora* (*L. muralis* group), *Dactylospora pleiosperma* (*Lecanora caesiorubella*) *Diplolaeviopsis ranula* (*Lecanora strobilina*), *Intralichen christiansenii, Lichenoconium erodens, Lichenoconium lecanorae, Lichenodiplis lecanorae, Lichenodiplis lecanoricola* (species on bark), *Muellerella erratica, M. lichenicola, Placocarpus americana* (*L. muralis*), *Rimularia insularis* (*L. rupicola* group), *Sclerococcum montagnei, Stigmidium squamariae, Sphaerellothecium propinquellum, Sphinctrina leucopoda, Sphinctrina turbinata, Thelocarpon lichenicola, Unguiculariopsis thallophilia, Vouauxiella lichenicola (Lecanora* species on bark)
***Lecidea* species:** *Lichenostigma saxicola, Polycoccum kerneri, Polysporina subfuscescens, Sphaerellothecium abditum*
***Lecidella* species:** *Arthonia intexta*
***Leptogium* species:** *Obryzum corniculatum*
***Lepraria* species:** *Arthonia excentrica, Athelia arachnoidea, Diploschistes muscorum* (*Lepraria xerophila*)
***Leprocaulon* species:** *Arthonia excentrica, Diploschistes muscorum*
***Letharia* species:** *Intralichen christiansenii, Lichenoconium cargillianum, Lichenostigma maureri, Phacopsis vulpina, Phaeosporobolus usneae, Tremella lethariae*
***Lobothallia* species:** *Cercidospora lobothalliae, Lichenostigma elongatum, Lichenostigma saxicola, Polysporina subfuscescens*
Mobergia angelica: *Endococcus matzeri*
***Niebla* species**: *Lichenoconium lecanorae, Tremella nieblae*
Paraschismatomma ochroleucum: *Trimmatostroma dendrographae*
***Parmelia* species:** *Abrothallus parmeliarum* (often overgrowing galls induced by *Nesolechia oxyspora*), *Lichenoconium lecanorae, Nesolechia oxyspora, Sphaerellothecium parmeliae, Sphaerellothecium reticulatum*
Parmelina coleae: *Abrothallus acetabuli*
***Parmotrema* species:** *Nesolechia oxyspora, Tremella parmeliarum*
***Peltigera* species:** *Niesslia peltigericola, Pezizella epithallina, Skytella mulleri*
***Pertusaria* species:** *Dactylospora parasitica, Dactylospora saxatilis, Lichenodiplis lecanorae, Minutoexcipula mariana, Minutoexcipula tuckerae, Opegrapha anomea, Phaeosporobolus alpina, Skyttea pertusariicola, Sphinctrina anglica, Sphinctrina leucopoda, Sphinctrina tubiformis, Sphinctrina turbinata*
***Phaeophyscia* species:** *Buelliella physciicola, Taeniolella phaeophysciae, Tremella phaeophysciae*
***Physcia* species:** *Arthonia epiphyscia, Lichenoconium lecanorae, Phoma physciicola, Stigmidium pumilum, Syzygospora physciacearum*
***Physconia* species:** *Phoma physciicola, Reconditella physconiarum, Schismatomma physconiicola* (not reported for California yet), *Syzygospora physciacearum*
Placidiopsis cinerascens: *Endococcus incrassatus*
***Placidium* species:** *Sphaerellothecium breussii*
Platismatia herrei: *Nesolechia oxyspora*
Pleopsidum flavum: *Lichenostigma saxicola, Rhizocarpon effiguratum*
Polysporina simplex: *Lichenostigma saxicola*
Pseudocyphellaria anthraspis: *Plectocarpon lichenum*
Pyrrhospora quernea: *Skyttea tavaresiae*

***Psora* species:** *Stigmidium psorae*

***Ramalina* species:** *Abrothallus suecicus, Arthonia farinacea* (in soralia), *Lichenoconium usneae, Phaeosporobolus usneae, Stigmidium ramalinae, Tremella ramalinae*

***Rhizocarpon* species:** *Muellerella ventosicola*

***Rhizoplaca* species:** *Arthonia clemens*

***Rimelia* species:** *Tremella parmeliarum*

***Rinodina* species:** *Lichenodiplis rinodinicola*

***Sarcogyne* species:** *Acaroconium punctiforme*

Sigridea californica: *Muellerella lecanactidis*

Sparria cerebriformis: *Arthonia infectans*

Sphaerophorus tuckermanii: *Nigropuncta rugulosa, Opegrapha sphaerophoricola*

***Sporastatica* species:** *Rhizocarpon pusillum*

***Staurothele* species:** *Heteroplacidium zamenhofianum, Placopyrenium noxium, Verrucaria bernardinensis, Verrucaria certera*

***Sticta* species:** *Abrothallus welwitschii*

***Thelomma* species:** *Endococcus thelommatis*

Teloschistes chrysopthalmus: *Marchandiomyces corallinus, Sphaerellothecium subtile*

Toninia: *Stigmidium tabacinae*

***Usnea* species:** *Abrothallus usneae* (often on galls induced by *Biatoropsis usnearum*); *Biatoropsis usnearum, Cystobasidium usneicola, Lichenoconium usneae, Lichenostigma maureri, Phaeosporobolus usneae*

***Verrucaria* species:** *Endococcus rugulosus, Lichenothelia renobalesiana, Muellerella erratica*

***Xanthoria* and *Xanthomendoza* species:** *Athelia arachnoidea, Cercidospora xanthoriae, Lichenoconium xanthoriae, Zwackhiomyces coepulonus*

***Xanthoparmelia* species:** *Abrothallus caerulescens, Abrothallus tulasnei, Arthonia xanthoparmeliarum, Lichenoconium erodens, Lichenostigma cosmopolites, Neolamya xanthoparmeliae, Nesolechia oxyspora, Stigmidium xanthoparmeliarum, Weddellomyces xanthoparmeliae*

***Xanthoria elegans*:** *Arthonia molendoi, Cercidospora caudata, Lichenochora xanthoriae, Zwackhiomyces coepulonus*

***Zahlbrucknerella* species:** *Endococcus zahlbrucknerellae*

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A Provisional Survey of Lichen Diversity in south-central South Carolina, U.S.A., from the 19th Tuckerman Lichen Workshop

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ABSTRACT. – The Tuckerman Lichen Workshop is an annual event where professional and amateur lichenologists convene to practice their skills in lichen identification while exploring the lichen diversity of an area in eastern North America. The 19th workshop in this series was held in the Augusta-Aiken area of Georgia and South Carolina from 11-15 March 2010. While we visited sites on both sides of the state line, this report presents checklists from three sites visited in South Carolina. Habitats visited represent the Piedmont and Southeastern Plains ecoregions and contain forested and rocky habitats, including granitic outcrops and bluffs, mesic and bluff forest, and sandhill oak-pine forest. We found a combined diversity of 255 taxa with 93, 125 and 148 taxa per site. Site lichen biotas were found to have low diversity similarities with Jaccard results each ≤ 0.25, and were found to differ in terms of habit (growth form) and substrate. Noteworthy finds include three recently described species: *Caloplaca yuchiorum* , *Lepraria hodkinsoniana*, and *Ramboldia blochiana*. Also newly reported for South Carolina are *Graphis oxyclada* and *G. pinicola*, both recently reported as new to North America.

KEYWORDS. – Biodiversity, checklist, lichens, South Carolina, forest.

INTRODUCTION

The southeastern United States has received increasing lichenological attention in recent years resulting in the publication of a number of checklists (e.g. Beeching et al. 2008; Hansen & Lendemer 2008; Hodkinson 2010; Hodkinson & Case 2008; Hodkinson & Lendemer 2011; Hodkinson et al. 2009; Ladd 2009; Lendemer & Yahr 2004; Lücking et al. 2011; Perlmutter 2007a, 2007b, 2008, 2009; Perlmutter & Beeching 2011; Perlmutter & Lendemer 2008) and taxonomic works (e.g. Grube & Lendemer 2009; Lendemer 2007; Lendemer et al. 2008; Lendemer & Hodkinson 2009a, 2009b, 2010; Hodkinson & Lendemer 2011a, 2011b; Hodkinson & Lendemer in press). Yet despite the recent progress, the lichen biota

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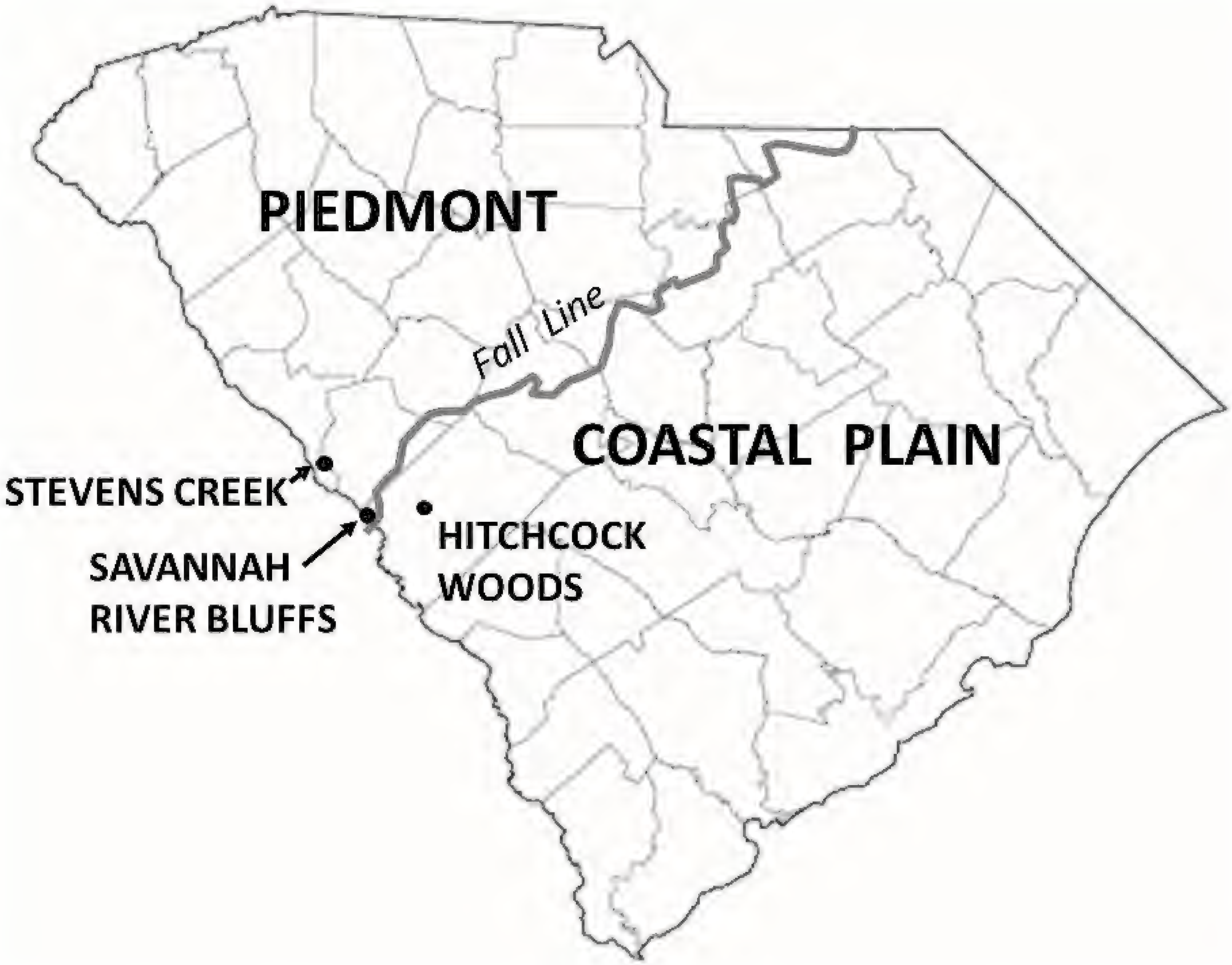

Figure 1. Map of South Carolina, U.S.A. depicting the three sites visited during the 19th Tuckerman Lichen Workshop in March 2010. (Map by Walt Kubilius.)

of this part of the world remains poorly understood and requires substantial additional study. Such study is imperative considering that lichens are widely recognized as indicators of air quality and environmental health (McCune 2000), and many habitats in the southeastern Coastal Plain are threatened by a myriad of anthropogenic forces including habitat loss and climate change (Auch 2000, Griffith & Loveland 2001, Griffith et al. 2003, Ricketts et al. 1999).

The Tuckerman Lichen Workshops were created by Dr. Richard C. Harris of the New York Botanical Garden in 1994 to train amateur naturalists in basic lichenology and lichen taxonomy through regular forays to locations throughout eastern North America (http://www.nybg.org/bsci/lichens/eln/, accessed 4 October 2010). These workshops have the additional objective of helping to catalogue the lichen diversity of this part of the world.

The nineteenth workshop in this series was held in the Augusta-Aiken area of Georgia and South Carolina from 11-15 March 2010 to focus on the Fall Line area that separates the Coastal Plain and Piedmont regions. While lichens collected in Georgia are included in the Georgia Lichen Atlas Project (Beeching & Hodges unpublished data), those from South Carolina are reported here.

STUDY AREA

Three sites were visited in South Carolina during the workshop. These sites include: 1) Stevens Creek Heritage Preserve / Wildlife Management Area in Edgefield and McCormick counties north of Augusta, 2) Savannah River Bluffs Heritage Preserve in Aiken County along the state line with Georgia, and 3) Hitchcock Woods in Aiken County in the town of Aiken (Fig. 1). Habitats include rocky bluffs and a variety of forests in the Piedmont and Southeastern Plains ecoregions (Griffith et al. 2002).

The sites straddle both sides of the Fall Line, the boundary that separates the Piedmont and the Coastal Plain geological provinces and runs from New York City to Birmingham, Alabama, passing through Augusta, Georgia. The geology of the Piedmont is ancient igneous and metamorphic rocks, whereas the rocks of the Coastal Plain are younger in origin, lying in horizontal layers of unconsolidated sediments of sand, gravel and clay. Sediments of the Coastal Plain were derived by erosion of the adjacent Piedmont, and transported to their current place by rivers and ocean currents. Not only does the Fall Line separate two geological provinces, but also two ecoregions: the Piedmont and Southeastern Plains, as the geology influences the soils of an area, which in turn influences the vegetation and other biotic communities. More detailed descriptions of the sites visited are as follows:

STEVENS CREEK – Stevens Creek Heritage Preserve / Wildlife Management Area is situated in the Piedmont along a stretch of Stevens Creek, which is a tributary of the Savannah River. At 17 mi. (27 km) NW of Augusta, this 434-acre (176-ha) preserve is managed by the South Carolina Department of Natural Resources (SCDNR). Habitats include a ridgetop pine forest dominated by *Pinus taeda* and *P. echinata* that slopes down into ravines of mesic mixed hardwood forest to a well-developed floodplain with old growth forest next to the creek. Adjacent to the floodplain is a bluff, composed of ancient Precambrian / Paleozoic aged gneiss and granitic rocks (Secor 1987). Vegetation of this bluff was discovered to contain what former UNC Herbarium Director Al Radford called "a relic of a once more wide-spread mixed mesophytic forest that grew in this area during the last glacial period of the Pleistocene" (Radford 1959). The preserve is also noteworthy for containing 15 rare plant species as well as the state-listed endangered Webster's salamander (*Plethodon websteri*). Topographic relief in the preserve is about 145 ft (45 m) [elevation range: 230-375 ft (70-115 m)]. Source: https://www.dnr.sc.gov/mlands/managedland?p_id=15 (Accessed 7 April 2012).

SAVANNAH RIVER BLUFFS – Just outside the city limits of North Augusta, South Carolina, Savannah River Bluffs Heritage Preserve is a 84-acre (34-ha) SCDNR-managed area along the slopes adjacent to the Savannah River. The preserve contains 1075 ft (328 m) of river frontage on one of the few remaining river shoals of the Savannah River, harboring the rare Rocky Shoals Spider Lily (*Hymenocallis coronaria*). Rocks which make up the shoals and bluffs are Piedmont metavolcanics and metasediments of late Precambrian or early Paleozoic age. The vegetation is mesic mixed forest with alluvial elements and a mix of Piedmont and Coastal Plain species. The preserve is also home to the federally endangered Relict Trillium (*Trillium reliquum*) and other rare plants. Topographic relief in the preserve is about 180 ft (55 m) [elevation: 150-290 ft (45-90 m)]. Source: https://www.dnr.sc.gov/mlands/managedland?p_id=73 (Accessed 7 April 2012).

HITCHCOCK WOODS – Hitchcock Woods is an 2100-acre (850-ha) privately owned equestrian preserve located in the town of Aiken in the Sandhills region of the Coastal Plain. The site is underlain by horizontal layers of unconsolidated sand, clay, and gravel, of Cretaceous and Eocene ages (Nystrom and Willoughby 1982). The area consists of a swampy lowland, which rises up to a small open disturbed area, the Chalk Cliffs, at the top of a hill. The Chalk Cliffs themselves constitute the highwall of a disused borrow pit, perhaps a hundred years old (W. Kubilius, pers. obs.). Since the quarry was abandoned, accelerated erosion has removed three feet of soil from just above and beyond the highwall, and lesser amounts backing away from the highwall, toward intact forest. On the cliffs is a pronounced hardpan. Vegetation in the Hitchock Woods included swamp forest, longleaf pine forest and an unusual, pine-oak-mountain laurel woodland, the lattermost atop Chalk Cliffs. Topographic relief in the area is approximately 245 ft (75 m) [elevation: 250-490 ft (75-150 m)].

MATERIALS AND METHODS

An informal foray survey style was followed in the field, with participants collecting specimens representing the lichen biota of each site. Collections were studied and deposited in public and personal herbaria, including: NY (W.R. Buck, R.C. Harris, B.P. Hodkinson and J.C. Lendemer), NCU (J.P. Hollinger and G.B. Perlmutter), HB-GUCCION (J.G. Guccion), and HB-LAY (E. Lay). A set of GBP's duplicates were deposited in USCH as part of an exchange program between NCU and USCH. Checklists were compiled from the collections data with total diversities tallied by species, genus and family as well as growth form (hereafter habit) and substrate type. To compare the lichen diversities among the three sites, pairwise Jaccard tests were run on the checklists (see Perlmutter 2008 for methodology).

RESULTS AND DISCUSSION

A total of 255 species were determined from all sites, in 109 genera representing 47 families. Individual sites yielded 93 taxa in Stevens Creek, 125 taxa in Savannah River Bluffs and 148 taxa in Hitchcock Woods. Broken down by habit, the combined lichen biota is 64% crustose, 19% foliose and 16% fruticose (Table 2). The largest families represented include Parmeliaceae (34 species in 11 genera or 13%), Physciaceae (23 spp. in 9 genera or 9%), Graphidaceae (23 spp. in 12 genera or 9%), Cladoniaceae (21 spp. in 2 genera or 8%), and Lecanoraceae (13 spp. in 4 genera or 5%).

The three sites each had a distinct lichen biota with Jaccard similarity indices ≤ 0.25 between species list pairs (see table 1 in appendix A). They differed also in their respective habit and substrate profiles, with Stevens Creek having most evenly distributed among both variable types, Savannah River having the largest proportion crustose lichens, and Hitchcock Woods having the highest proportion of corticolous lichens (see tables 2 and 3 in appendix A). Hitchcock Woods is also distinct by lacking rocks, thereby lacking a saxicolous component in its lichen biota. It also had the highest proportion of terricolous lichens.

Site lichen biotas also differed in the largest families represented (see table 4 in appendix A). Parmeliaceae is the largest family represented fairly evenly at 16, 17, and 18% in each of the sites. Cladoniaceae is variable among sites with significant representation in Stevens Creek and Hitchcock Woods, both over 10%, yet only minorly represented in Savannah River Bluffs. Similarly, Graphidaceae is significantly represented in Hitcock Woods and Savannah River Bluffs, yet not in Stevens Creek.

Noteworthy finds from the Workshop visits include three recently described species: *Caloplaca yuchiorum* Lendemer & C.A. Morse, a sterile, sorediate, crustose lichen that was a community dominant on the rocks of Savannah River Bluffs; *Lepraria hodkinsoniana* Lendemer, and *Ramboldia blochiana* Lendemer & R.C. Harris, both found in Hitchcock Woods. Also newly reported for South Carolina are *Graphis oxyclada* Müll. Arg. and *G. pinicola* Zahlbr., both recently reported as new to North America (Lendemer 2010). These two taxa were found at Savannah River Bluffs.

Possible explanations for the observed differences among the lichen biotas of the three sites include environmental, microenvironmental or substratal chemistry differences as well as variability in sampling by participants per site. Both Stevens Creek and Savannah River Bluffs contain similar forests with rocky bluffs, but these are of different aspect. Stevens Creek has a north-facing rocky bluff, supporting a cooler microclimate, while Savannah River Bluffs is facing south-west, and thus supports a warmer microclimate with greater sun exposure. Hitchcock Woods is distinct by being situated in the sandhills region, with a lack of rocks, and different forest types. Substratal acidity or other chemical characteristics could also contribute to the differences of lichen biotic composition among the three sites, but these were not measured. Also, the three sites were sampled by varying participants, as not everyone could visit all sites throughout the workshop, thus introducing “sampler error” as a source of variation. A more structured sampling of the three sites could yield a more complete and comparable set of lichen species diversities among the three sites.

ANNOTATED CHECKLISTS

The following lists represent the products of an inventory of lichen collections made in South Carolina during the 19th Tuckerman Lichen Workshop in March 2010. Nomenclature follows Esslinger (2010) unless otherwise indicated. Nomenclature reflects the determiner’s preference; in instances where this deviates from Esslinger (2010) a synonym is provided. It should be noted that throughout the checklists we follow Lendemer and Hodkinson (2012) in recognizing members of the *Canoparmelia crozalsiana* as a member of the genus *Crespoa* (D. Hawksw.) Lendemer & Hodkinson and that we follow Hawksworth et al. (2011) in merging *Parmelinopsis* Elix & Hale with *Hypotrachyna* (Vain.) Hale. Following each taxon are specimen citations, each followed by substrate, including the genus / species of phorophyte if recorded.

1) USA, South Carolina, McCormick County, Sumter National Forest, Stevens Creek Heritage Preserve, N of SSR 88, ca. 1.7 mi. (2.7 km) NE of Clarks Hill [33°41'14"N, 82°09'41"W; 230-330 ft (70-

100 m elev.)]. Ecoregion: Piedmont (Southern Outer Piedmont); habitat: mesic mixed hardwood bluff forest with granitic outcrops. Visited 11 March 2010.

Acarospora dispersa H. Magn. – *Lay 10-0192, 10-0193, 10-0195, 10-0196*. Saxicolous on siliceous rock.
Amandinea punctata (Hoffm.) Coppins & Scheid. – *Lay 10-0076*. Lignicolous.
Anisomeridium biforme (Borer) R.C. Harris – *Guccion 1603*. Corticolous on *Quercus alba*.
Anthracothecium nanum (Zahlbr.) R.C. Harris – *Perlmutter 2363*. Corticolous on *Carya* sapling.
Arthonia rubella (Fée) Nyl. – *Harris 55841, 55856, 55871*; *Perlmutter 2365*. Corticolous on *Carya* and *Quercus*.
Arthonia taediosa auct. Amer. (syn. *Arthothelium taediosum*) – *Guccion 1604*. Corticolous on fallen branch.
Arthonia sp. – *Buck 56020*; *Harris 55860-B*. These may be different taxa; corticolous on branches.
Arthopyrenia cinchonae (Ach.) Müll. Arg. – *Harris 55860-C*. Corticolous on branches.
Bacidia heterochroa (Müll. Arg.) Zahlbr. – *Harris 55857*. Corticolous on *Carya*.
Bacidia schweinitzii (Fr. *ex* Tuck.) A. Schneid. – *Buck 56011, 56024* (brown apothecial form), *Guccion 1605*; *Harris 55844, 55864, 55872*; *Lay 10-0202*. Corticolous on trees including *Acer* and *Craetegus*.
Buellia curtisii (Tuck.) Imshaug (syn. *Baculifera curtisii*) – *Harris 55873*. Corticolous on a fallen branch.
Buellia mamillana (Tuck.) W.A. Weber – *Buck 56006*. Saxicolous.
Buellia stillingiana J. Steiner – *Guccion 1606*. Corticolous on fallen branch.
Bulbothrix goebelii (Zahlbr.) Hale – *Harris 55847*. Corticolous on a vine.
Caloplaca camptidia (Tuck.) Zahlbr. – *Buck 56008*; *Perlmutter 2366*. Corticolous on *Carya tomentosa* trunk.
Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth. – *Buck 56031*; *Lay 10-0083*; *Perlmutter 2359*; *Schaefer 567*. Saxicolous on rocks near stream.
Canoparmelia caroliniana (Nyl.) Elix & Hale – *Harris 55859*. Corticolous / lignicolous on a snag.
Canoparmelia texana (Tuck.) Elix & Hale – *Lay 10-0087*. Corticolous.
Chrysothrix xanthina (Vain.) Kalb – *Guccion 1607*; *Harris 55891*; *Lay 10-0063*; *Perlmutter 2373*; *Schaefer 660*. Corticolous on pines and hardwoods, lignicolous on a snag and log.
Cladonia caroliniana Tuck. – *Lay 10-0086*. Terricolous.
Cladonia didyma (Fée) Vainio – *Schaefer 664*. Lignicolous on decomposing wood.
Cladonia didyma var. *vulcanica* (Zoll. & Moritzi) Vain. – *Harris 55870, 55889*. Lignicolous on logs.
Cladonia leporina Fr. – *Harris 88542*. Terricolous.
Cladonia macilenta Hoffm. – *Perlmutter 2375*. Lignicolous on a decomposing pine stump.
Cladonia peziziformis (With.) J.R. Laundon – *Harris 55888*. Terricolous on a roadbank.
Cladonia polycarpia G. Merr. – *Harris 55869*. Terricolous.
Cladonia ramulosa (With.) J.R. Laundon – *Harris 55849*. Lignicolous on a log.
Cladonia ravenelii Tuck. – *Perlmutter 2376*. Corticolous on a *Pinus taeda* snag.
Cladonia strepsilis (Ach.) Grognot – *Guccion 1608*; *Harris 55892*. Terricolous on a roadbank.
Cladonia subtenuis (Abbayes) Mattick – *Harris 55876*. Terricolous.
Coccocarpia palmicola (Sprengel) Arv. & D.J. Galloway – *Lay 10-0091, 10-092*. Corticolous and muscicolous.
Dermatocarpon luridum (With.) J. R. Laundon – *Buck 56027*. Saxicolous.
Fellhanera hybrida? (pycnidia not seen) – *Perlmutter 2361a*. Saxicolous on a granitic boulder.
Graphis scripta (L.) Ach. – *Harris 55862*. Corticolous on a small *Acer*.
Heterodermia appalachensis (Kurok.) W.L. Culb. – *Lay 10-0103*. Muscicolous.
Hypocenomyce anthracophila (Nyl.) P. James & Gotth. Schneider – *Perlmutter 2374*. Corticolous on *Pinus taeda* snag.
Hypotrachyna livida (Taylor) Hale – *Guccion 1609*; *Harris 55863*; *Perlmutter 2372*. Corticolous on fallen branches.
Hypotrachyna spumosa (Asahina) Krog & Swinsc. (syn. *Parmelinopsis spumosa*) – *Harris 55845*. Corticolous on a vine.
Lecanora hybocarpa (Tuck.) Brodo – *Guccion 1611*. Corticolous on fallen branch.
Lecanora subimmergens Vain. – *Buck 56025*; *Lay 10-0053*; *Schaefer 602*. Saxicolous.
Lecanora subpallens Zahlbr. – *Guccion 1610*. Corticolous on a log.
Lecidea plebeja Nyl. – *Harris 55893*. Lignicolous.

Leiorreuma explicans (Fink) Lendemer – *Harris 55865, 55879, 55890, 55860-A*; *Perlmutter 2380*. Corticolous on *Crataegus* and fallen branches.

Lepraria caesiella R.C. Harris – *Buck 56014*; *Harris 55848*. Corticolous on pine trunk bases.

Lepraria lobificans Nyl. – *Harris 55882*. Corticolous on *Carya* trunk base.

Leptogium lichenoides (Nyl.) Zahlbr. – *Lay 10-0098*. Muscicolous.

Lobaria ravenelii (Tuck.)Yoshim. – *Harris 55880*; *Hollinger 2697*. Saxicolous on top of granitic bluff.

Loxospora pustulata (Brodo & W.L. Culb.) R.C. Harris – *Guccion 1612*. Corticolous on hardwood.

Micarea neostipitata Coppins & P. May – *Buck 56019*. Corticolous on pine.

Myelochroa aurulenta (Tuck.) Elix & Hale – *Harris 55874*. Corticolous / lignicolous on a log.

Nadvornikia sorediata R.C. Harris – *Harris 55861*; *Lay 10-0011*. Corticolous on *Crataegus*.

Ochrolechia africana Vainio – *Guccion 1613*; *Perlmutter 2370*. Corticolous on twigs and branches.

Opegrapha corticola Coppins & P. James – *Buck 56033*; *Lay 10-0012*. Corticolous.

Opegrapha vulgata Ach. –*Buck 56030*; *Perlmutter 2379*. Corticolous on *Carya tomentosa* trunk.

Parmeliopsis subambigua Gyelnik – *Perlmutter 2377*. Corticolous on *Pinus taeda* snag.

Parmotrema cetratum (Ach.) Hale – *Harris 55866*. Lignicolous on a log.

Parmotrema perforatum (Jacq.) A. Massal. – *Harris 55858, 55884*; *Lay 10-0104*; *Perlmutter 2367*. Corticolous on fallen branches and twigs.

Parmotrema reticulatum (Taylor) M. Choisy – *Harris 55881*. Corticolous on a fallen branch.

Parmotrema submarginale (Michx.) DePriest & B. Hale – *Harris 55858-A*. Corticolous on a fallen branch.

Parmotrema tinctorum (Delise *ex* Nyl.) Hale – *Lay 10-0099*. Corticolous.

Pertusaria amara (Ach.) Nyl. – *Guccion 1614*. Corticolous on hardwood trunk.

Pertusaria epixantha R.C. Harris – *Lay 10-0105, 10-0106*; *Perlmutter 2371*. Lignicolous, muscicolous and corticolous, the latter most including fallen twigs.

Pertusaria macounii (I.M. Lamb) Dibben – *Schaefer 663*. Corticolous on hardwoods.

Pertusaria ostiolata Dibben – *Harris 55883*. Corticolous on *Ulmus alata*.

Pertusaria paratuberculifera Dibben – *Guccion 1615*; *Harris 55852*; *Lay 10-0108*; *Schaefer 659*. Corticolous on hardwoods, including *Quercus*.

Pertusaria pustulata (Ach.) Duby – *Guccion 1616*. Corticolous on a fallen branch.

Pertusaria texana Müll.Arg. – *Guccion 1617*; *Harris 55855*. Corticolous.

Pertusaria valliculata Dibben – *Buck 56023*. Corticolous.

Pertusaria velata (Turner) Nyl. – *Guccion 1618*. Corticolous on a log.

Phlyctis boliviensis Nyl. (syn. *P. ludoviciensis*) – *Harris 55875*; *Perlmutter 2362*. Corticolous on hardwood trunks and branches.

Phlyctis petraea R.C. Harris –*Buck 56009* (stictic acid chemotype). Saxicolous.

Phyllopsora corallina (Eschw.) Müll.Arg. – *Harris 55851*; *Perlmutter 2378*. Corticolous on *Carya* and unidentified fallen twig.

Porina heterospora (Fink *ex* J. Hedrick) R.C. Harris – *Buck 56037*; *Perlmutter 2364*. Corticolous on *Acer leucoderma* trunk.

Porpidia albocaerulescens (Wulfen) Hertel & Knoph – *Buck 56015*. Saxicolous.

Pseudosagedia guentheri (Flot.) Hafellner & Kalb – *Perlmutter 2361*. Saxicolous on granitic rock.

Pseudosagedia isidiata (R.C. Harris) R.C. Harris – *Buck 56036*. Corticolous.

Punctelia rudecta (Ach.) Krog – *Guccion 1619*. Corticolous on a log.

Pycnothelia papillaria Dufour – *Guccion 1620*; *Harris 55877*. Terricolous on roadbank.

Pyrenula punctella (Nyl.) Trevis. – *Lay 10-0221*. Corticolous on *Fagus grandifolia*.

Pyrenula ravenelii (Tuck.) R.C. Harris – *Buck 56012*; *Guccion 1621*. Corticolous on *Carya* trunk.

Pyrrhospora varians (Ach.) R.C. Harris – *Guccion 1623*. Corticolous on a fallen branch.

Pyxine subcinerea Stirton – *Guccion 1624*. Corticolous on *Quercus*.

Ramboldia russula (Ach.) Kalb, Lumbsch & Elix – *Buck 56032*; *Guccion 1622*; *Harris 55843*. Corticolous on branches.

Rinodina destituta (Nyl.) Zahlbr. – *Buck 56010*. Saxicolous.

Rinodina granuligera H. Magn. – *Harris 55868*. Corticolous on *Carya*.

Scoliciosporum chlorococcum (Stenh.) Vězda – *Lay 10-0232*. Corticolous on *Pinus*.

Staurothele tenuissima Degel. – *Perlmutter 2360*. Saxicolous on a granitic boulder.

Sticta carolinensis T. McDonald – *Buck 56021*; *Lay 10-0167*. Muscicolous and saxicolous on vertical rock faces.

Strigula viridiseda (Nyl.) R.C. Harris – *Harris 55854*. Corticolous on *Carya*.

Teloschistes exilis (Michx.) Vain. – *N. Lowe s.n.* (NCU). Corticolous on a fallen twig in alluvial forest.
Thelotrema defectum Hale – *Lay 10-0169*. Corticolous.
Usnea endochrysea Stirt. – *Harris 55846* (norstictic acid chemotype). Corticolous on a fallen branch.
Usnea mutabilis Stirton – *Guccion 1625*; *Perlmutter 2369*. Corticolous, including fallen twigs.
Usnea strigosa (Ach.) Eaton –*Buck 56028*; *Lay 10-0170*; *Perlmutter 2368*. Corticolous, including fallen twigs.

2) USA, South Carolina, Aiken County, Savannah River Bluffs Heritage Preserve, SW of Old Plantation Road, ca. 1 mi. (1.6 km) SW of the intersection of highways I-20 and GA-230 [33°31'30"N, 82°00'23"W; 215 ft (65 m elev.)]. Ecoregion: Southeastern Plains; habitat: mesic mixed hardwood bluff forest with felsic/mafic outcrops. Visited on 13 March 2010.

Acarospora dispersa H. Magn. – *Lay 10-0191, 10-0194*. Saxicolous on mafic rock.
Agonimia sp. – *Buck 56117*. Saxicolous on rock along stream.
Anisomeridium distans (Willey) R.C. Harris – *Buck 56112*. Saxicolous.
Arthonia rubella (Fée) Nyl. – *Buck 56098*; *Harris 55976*, *55989*; *Lay 10-0200*; *Lendemer 22009*; *Perlmutter 2410*; *Schaefer 559*. Corticolous on hardwoods, including *Acer, Carpinus, Carya, Quercus*.
Arthonia cf. *rubella* – *Perlmutter 2407*. Keys to *A. rubella* based on spore and photobiont characters, but has thicker, black apothecia. Corticolous on *Acer* trunk on floodplain.
Arthonia taediosa auct. Amer. (Syn. *Arthothelium taediosum*) – *Lendemer 21971*. Coticolous on *Acer*.
Aspicilia sp. – *Lendemer 22039*. Saxicolous.
Bacidia coprodes (Körb.) Lettau – *Buck 566016*. Saxicolous.
Bacidia reagens Malme – *Buck 56015*. Corticolous on hardwood trunk.
Bacidia schweinitzii (Fr. *ex* Tuck.) A. Schneid. – *Buck 56103* (brown apothecial form); *Harris 55964*; *Lendemer 22005*. Corticolous on hardwoods, including *Quercus* and *Ulmus*.
Bacidia sp. – *Buck 56109*. Corticolous.
Bacidina delicata (Leight.) V. Wirth & Vezda – *Buck 56017*. Saxicolous on rock along stream.
Bacidina sp. – *Buck 56083*. Corticolous.
Bathelium carolinianum (Tuck.) R.C. Harris – *Lendemer 22025*; *Perlmutter 2421*. Corticolous on hardwoods, including *Carya* and a sapling near the tributary.
Buellia curtisii (Tuck.) Marbach (syn. *Baculifera curtisii*) – *Guccion 1626*. Corticolous on a fallen branch.
Buellia mamillana (Tuck.) W.A. Weber – *Guccion 1627*; *Harris 55974, 55978*; *Lay 10-01071, 10-0073*; *Lendemer 22045*; *Perlmutter 2409*; *Schaefer 551*. Saxicolous on rocks and bluffs along river.
Buellia spuria (Schaerer) Anzi – *Guccion 1628*; *Lay 10-0124B*. Saxicolous, including outcrop.
Buellia stillingiana J. Steiner – *Lendemer 21966*. Corticolous on *Acer*.
Buellia wheeleri R.C. Harris (Syn. *Ciposia wheeleri*) – *Lendemer 22010*. Corticolous on *Quercus*.
Bulbothrix goebelii (Zahlbr.) Hale – *Lendemer 22002*. Corticolous on *Quercus*.
Byssoloma leucoblepharum (Nyl.)Vain. – *Lendemer 21981*. Corticolous on *Fagus* root.
Byssoloma meadii (Tuck.) S. Ekman – *Lendemer 21955*. Corticolous on *Fagus* root.
Caloplaca yuchiorum Lendemer – *Buck 56100*; *Guccion 1636; Lay 10-0110*, *10-0124*; *Lendemer 22026* (type collection); *Perlmutter 2419*. Described as new to science by Lendemer and Morse (2010). Saxicolous on rocks near river.
Candelaria concolor (Dicks.) Stein – *Guccion 1629*; *Harris 55958*. Corticolous trunk and fallen branch.
Candelaria fibrosa (Fr.) Müll. Arg. – *Schaefer 555*. Corticolous on a fallen *Quercus*.
Candelariella xanthostigmoides (Müll. Arg.) R.W. Rogers – *Lendemer 21968*. Corticolous on *Acer*.
Canoparmelia caroliniana (Nyl.) Elix & Hale – *Guccion 1630*; *Harris 55980*. Corticolous on a fallen *Pinus* and saxicolous at base of cliff.
Canoparmelia texana (Tuck.) Elix & Hale – *Harris 55959, 55970*; *Lendemer 21960* (fertile); *Perlmutter 2406*, *2412*. Corticolous on trees and saxicolous on a vertical rock wall of bluff.
Chrysothrix chamaecyparicola Lendemer – *Lendemer 21958*. Corticolous on *Pinus*.
Chrysothrix xanthina (Vain.)Kalb – *Guccion 1631*; *Harris 55993*. Corticolous, including on *Robinia*.
Cladonia peziziformis (With.) J.R. Laundon – *Lendemer 21967*. Terricolous on humus.
Coenogonium luteum (Dicks.) Kalb & Lücking – *Buck 56091; Lendemer 21997*; *Schaefer 556*. Corticolous on *Pinus*.
Coenogonium pineti (Ach.) Lücking & Lumbsch – *Lay 10-0203*; *Lendemer 21979*. Corticolous on *Fagus* root and on *Pinus*.

Crespoa crozalsiana (Harm.) Lendemer & Hodkinson (syn. *Canoparmelia crozalsiana*) – *Harris 55992, 55995A*. Corticolous on *Acer* and *Quercus*.

Dermatocarpon muhlenbergii (Ach.) Müll. Arg. – *Lay 10-0061*. Saxicolous on siliceous rock.

Dictyocatenulata alba Finley & E.F. Morris – *Lendemer 21980*. Corticolous on *Fagus* root.

Dirina massiliensis Durieu & Mont. f. *sorediata* (Müll. Arg.) Tehler – *Lendemer 21985, 22030*. Saxicolous.

Dirinaria frostii (Tuck.) Hale & W.L. Culb. – *Guccion 1632*; *Lay 10-0140*; *Lendemer 22028*; *Perlmutter 2417*. Saxicolous on bluff wall.

Fellhanera hybrida R.C. Harris & Lendemer – *Buck 56088, 56113*; *Lendemer 22035* (pycnidia only); *Perlmutter 2418*. Saxicolous.

Fissurina insidiosa C. Knight & Mitt. – *Lendemer 21963*. Corticolous on *Fagus*.

Flakea papillata O.E. Erikss. – *Buck 56086*; *Guccion 1633*; *Lay 10-0094*; *Lendemer 22038* (dup in NCU). Saxicolous on shaded vertical bluff wall.

Gomphillus americanus Essl. – *Buck 56085*. Corticolous.

Graphis oxyclada Müll. Arg. – *Lay 10-0205*. Recently reported as new to North America (Lendemer 2010), new to South Carolina. Corticolous *on Quercus*.

Graphis pinicola Zahlbr. – *Perlmutter 2423*; *Schaefer 599*. Recently reported as new to North America (Lendemer 2010), here represents new to South Carolina. Corticolous on *Acer* and a hardwood sapling.

Graphis sp. – *Lendemer 21991*. Corticolous on *Acer*.

Heterodermia albicans (Pers.) Swinscow & Krog – *Guccion 1634*; *Harris 55957*, *55983*; *Lendemer 22011*; *Schaefer 592*. Corticolous on *Acer* and *Quercus*, and saxicolous.

Hyperphyscia syncolla (Tuck. *ex* Nyl.) Kalb – *Lendemer 21972*. Corticolous on *Acer* branch.

Hypotrachyna horrescens (Taylor) Krog & Swinsc. (syn. *Parmelinopsis horrescens*) – *Lendemer 21992*. Corticolous on *Acer*.

Hypotrachyna livida (Taylor) Hale – *Harris 55982*; *Lendemer 21967*. Corticolous.

Hypotrachyna minarum (Vain.) Krog & Swinsc. (syn. *Parmelinopsis minarum*) – *Harris 55991*. Corticolous on *Quercus*.

Ionaspis alba Lutzoni – *Harris 55971*. Saxicolous.

Lecanora chlarotera Nyl. – *Lendemer 21989*. Corticolous on *Acer*.

Lecanora hybocarpa (Tuck.) Brodo – *Lendemer 21964*. Corticolous on *Acer*.

Lecanora louisianae de Lesd. – *Buck 56101*; *Harris 55988*; *Lendemer 21990*. Corticolous on *Acer* and *Quercus*.

Lecanora strobilina (Spreng.) Kieff. – *Lendemer 22015*. Corticolous on *Juniperus*.

Lecanora subpallens Zahlbr. – *Lendemer 21987*. Corticolous on *Acer*.

Lecidella sp. – *Lendemer 22033, 22043A*. . Saxicolous.

Lepraria lobificans Nyl. – *Harris 55990*; *Lendemer 21996*. Corticolous on *Ulmus alata*, terricolous.

Lepraria normandinoides Lendemer & R.C. Harris – *Lendemer 22040* (procetraric acid chemotype). Saxicolous.

Lepraria sp. – *Lendemer 22027*. Saxicolous.

Leptogium austroamericanum (Malme) C.W. Dodge – *Harris 55995B*. Corticolous on *Quercus*.

Leucodecton subcompunctum (Nyl.) Frisch – *Lendemer 21961, 22000*. Corticolous on *Fagus* and *Quercus*.

Lithothelium illotum (Nyl.) Aptroot – *Harris 55973*. Corticolous on *Carya*.

Lithothelium phaeosporum (R.C. Harris) Aptroot – *Harris 55975*. Corticolous on *Fraxinus*.

Loxospora pustulata (Brodo & W.L. Culb.) R.C. Harris – *Lendemer 21959*. Corticolous on *Acer*.

Micarea micrococca (Körb.) Gams *ex* Coppins – *Buck 56115*. On a moist, rotten log.

Myelochroa aurulenta (Tuck.) Elix & Hale – *Lendemer 21976, 22004*. Corticolous on *Ostrya* and *Quercus*.

Myriotrema rugiferum (Harm.) Hale – *Lay 10-0150*. Corticolous.

Nadvornikia sorediata R.C. Harris – *Harris 55968*; *Lendemer 22006*. Corticolous on *Quercus* and *Ulmus alata*.

Ochrolechia africana Vain. – *Guccion 1635*. Corticolous on a fallen branch.

Ochrolechia trochophora (Vainio) Oshio – *Schaefer 588*. Corticolous on fallen *Quercus*.

Opegrapha corticola Coppins & P. James – *Buck 56114*; *Lendemer 22018*. Corticolous on *Quercus*.

Opegrapha varia Pers. – *Buck 56089*. Corticolous.

Opegrapha viridis (Ach.) Behlen & Desberger – *Lendemer 21982*. Corticolous on *Carya*.

Opegrapha vulgata Ach. – *Harris 55965*. Corticolous on *Carya*.

Opegrapha sp. – *Lendemer 22007*. Corticolous on *Quercus*.

Parmotrema hypoleucinum (J. Steiner) Hale – *Harris 55961*. Corticolous on fallen branch.

Parmotrema hypotropum (Nyl.) Hale – *Harris 55961-A*. Corticolous on fallen branch.

Parmotrema perforatum (Jacq.) A. Massal. – *Harris 55961-B*; *Lendemer 21994*, *21998*. Corticolous on branches, including *Acer*.

Parmotrema rampoddense (Nyl.) Hale – *Lendemer 21986*. Corticolous on *Acer*.

Parmotrema reticulatum (Taylor) M. Choisy – *Guccion 1637*. Corticolous on a fallen branch.

Parmotrema subisidiosum (Müll. Arg.) Hale – *Lendemer 22016*. Corticolous on *Juniperus*.

Parmotrema submarginale (Michx.) DePriest & B. Hale – *Lendemer 21974*. Corticolous on *Acer*.

Parmotrema tinctorum (Nyl.) Hale – *Guccion 1638*; *Harris 55972*; *Lendemer 21952*; *Perlmutter 2405*. Corticolous, including *Acer*, and saxicolous at cliff base.

Pertusaria epixantha R.C. Harris – *Harris 55981*; *Lendemer 21988*; *Perlmutter 2422*. Corticolous and saxicolous.

Pertusaria sinusmexicani Dibben – *Lendemer 21997*. Corticolous on *Acer*.

Pertusaria subpertusa Brodo – *Lendemer 21965*. Corticolous on *Acer*.

Pertusaria texana Müll. Arg. – *Lendemer 22003*; *Lay 10-0216*. Corticolous on *Quercus*.

Phaeographis inusta (Ach.) Müll.Arg. – *Lendemer 22023*; *Schaefer 661*. Corticolous on *Acer* and *Carya*.

Phaeographis subfulgurata (Nyl.) Zahlbr. – *Perlmutter 2425*. Corticolous on hardwood sapling.

Phaeographis sp. – *Perlmutter 2424*. Also found in the Fall Line area of Wake County, North Carolina (Perlmutter in rev.); may represent an undescribed species. Corticolous on hardwood sapling.

Phaeophyscia rubropulchra (Degel.) Essl. – *Guccion 1639*; *Harris 55986*; *Lendemer 22034*; *Perlmutter 2416*. Saxicolous.

Phlyctis boliviensis Nyl. (Syn. *Phlyctis ludovidiensis*) – *Harris 55966*; *Lendemer 22032*. Corticolous on *Acer*.

Phlyctis petraea R.C. Harris – *Harris 55969* (stictic acid chemotype); *Lendemer 22001* (stictic acid chemotype); *Lay 10-0154*. Saxicolous.

Physcia americana G. Merr. – *Harris 55967*, *55977*; *Lendemer 21975*. Corticolous, including *Acer, Robinia* and branches.

Physcia stellaris (L.)Nyl. – *Lendemer 21972*. Corticolous on *Acer* branch.

Physcia sp. – *Lendemer 22037*. Saxicolous.

Placynthiella dasaea (Stirt.) Tønsberg – *Buck 56082*. Corticolous on *Pinus* trunk base.

Porina heterospora (Fink *ex* J. Hedrick) R.C. Harris –*Buck 56102*; *Lendemer 22019*; *Schaefer 562*. Corticolous, including *Carya* and *Quercus*.

Porina scabrida R.C. Harris – *Lendemer 22029*. Corticolous on *Carya*.

Porpidia albocaerulescens (Wulfen) Hertel & Knoph – *Lendemer 21953* (stictic acid); *Perlmutter 2413*. Saxicolous.

Pseudosagedia cestrensis (Tuck. *ex* E. Michener) R.C. Harris – *Buck 56104*, *56111*; *Harris 55979*; *Lay 10-0113*; *Lendemer 21984*, *22022*, *22031*. Corticolous, on *Acer, Carya* and *Ostrya*.

Pseudosagedia guentheri (Flot.) Hafellner & Kalb. – *Buck 56084*, *5093*; *Lay 10-0222*. Saxicolous.

Punctelia rudecta (Ach.) Krog – *Harris 55987*; *Lendemer 21999*. Corticolous on *Robinia* and saxicolous.

Pyrenula leucostoma Ach. – *Buck 56097, 56116*; *Guccion 1640*; *Lendemer 22036*; *Perlmutter 2411, 2415*. Corticolous on hardwoods, including *Acer, Carpinus* and *Carya*.

Pyrenula punctella (Nyl.) Trevis. – *Lendemer 21978*. Corticolous on *Fagus*.

Pyrenula ravenelii (Tuck.) R.C. Harris – *Lendemer 22024*. Corticolous on *Carya*.

Pyrrhospora varians (Ach.) R.C. Harris – *Buck 56095* (pale form). Corticolous.

Pyxine subcinerea Stirt. – *Guccion 1641*; *Schaefer 565*. Saxicolous in open woodland.

Ramonia microspora Vezda – *Harris 55994-A*; *Lendemer 21954*, *22012*. Corticolous on *Fagus* root and on *Quercus*.

Reimnitzia santensis (Tuck.) Kalb – *Guccion 1642*. Substrate not recorded.

Rinodina destituta (Nyl.) Zahlbr. – *Lendemer 22041*; *Perlmutter 2420*. Saxicolous.

Rinodina papillata H. Magn. – *Harris 55994*. Corticolous on *Quercus*.

Rinodina tephraspis (Tuck.) Herre – *Buck 56087* (zeorin only); *Lay 10-0229*, *10-0230*, *10-0231*. *Schaefer 587*. Saxicolous.

Schismatomma sp. – *Buck 56108*. Corticolous on *Ilex opaca* trunk.

Thelopsis inordinata Nyl. – *Buck 56080, 56110*; *Lendemer 22014, 22017*. Corticolous on *Quercus*.

Thelopsis rubella Nyl. – *Lendemer 22013*. Corticolous on *Quercus*.

Thelotrema defectum (Hale) – *Lay 10-0168* (det. J.C. Lendemer). Corticolous.

Thelotrema subtile Tuck. – *Perlmutter 2408*. Corticolous on *Acer* sapling near tributary.
Topelia aperiens P.M. Jørg. & Vezda – *Buck 56081*; *Harris 55995*. Corticolous, including *Quercus*.
Trapelia coarctata (Sm.) M. Choisy – *Buck 56096*; *Perlmutter 2414*. Saxicolous near tributary.
Usnea endochrysea Stirt. – *Lendemer 21970* (norstictic acid chemotype). Corticolous on *Acer*.
Usnea strigosa (Ach.) Eaton – *Buck 56092* (norstictic acid chemotype). Corticolous.
Verrucaria sp. – *Buck 56090*; *Lay 10-0235*. These may represent different taxa. Both saxicolous.
Xanthoparmelia subramigera (Gyeln.) Hale – *Lendemer 21983*. Saxicolous.

3) USA, South Carolina, Aiken County, Hitchcock Woods, in town of Aiken, along Tea Cottage Path from entrance on Dibble Road to Chalk Cliffs [33° 33' 12"N, 81° 45' 20"W; 375 ft (115 m elev.)]. Ecoregion: Southeastern Plains (Sandhills); habitats: mixed pine-oak-*Kalmia latifolia* mesic sandhill woodland grading into mixed hardwood bottomland/swamp; mesic mixed hardwood bluff forest with outcrops of sand, gravel, and clay

Acanthothecis mosquitensis (Tuck.) E.A. Tripp & Lendemer – *Lendemer 22127A*. Corticolous on *Ilex*.
Agonimia sp. – *Buck 56153*. Terricolous.
Amandinea punctata (Hoffm.) Coppins & Scheid. – *Lay 10-0075*. Corticolous on *Pinus*.
Amandinea submontana Marbach – *Lendemer 22144*. Corticolous on *Quercus*.
Anthracothecium nanum (Zahlbr.) R.C. Harris – *Lendemer 22082*. Corticolous on *Acer*.
Arthonia albovirescens Nyl. – *Lendemer 22128*. Corticolous on *Ilex*.
Arthonia anglica Coppins – *Lendemer 22046*. Corticolous on *Ilex*.
Arthonia quintaria Nyl. – *Buck 56142*; *Lendemer 22146*. Corticolous on *Ilex* and *Quercus*.
Arthonia taediosa auct. Amer. (syn. *Arthothelium taediosum*) – *Perlmutter 2433*, *2440*. Corticolous on hardwoods, including *Ilex*.
Arthonia 50883 (Harris & Ladd 2005) – *Lay 10-0199*. Corticolous.
Bacidia schweinitzii (Fr. *ex* Tuck.) A. Schneid. – *Guccion 1643*. Corticolous on *Quercus* trunk.
Brigantiaea leucoxantha (Spreng.) R. Sant. & Hafellner – *Buck 56125*; *Lendemer 22109*. Corticolous on *Quercus*.
Buellia curtisii (Tuck.) Marbach (syn. *Baculifera curtisii*) – *Schaefer 553*. Corticolous on *Quercus* twigs.
Buellia imshaugiana R.C. Harris (syn. *Baculifera imshaugiana*) – *Buck 56134*; *Harris 56015*; *Lendemer 22111, 22112*. Corticolous on *Kalmia latifolia* branches.
Buellia stillingiana J. Steiner – *Lendemer 22134*. Corticolous on *Acer*.
Buellia wheeleri R.C. Harris (syn. *Ciposia wheeleri*) – *Lendemer 22076*. Corticolous on *Quercus*.
Bulbothrix confoederata (W.L. Culb.) Hale – *Hodkinson 11435*. Corticolous.
Bulbothrix goebelii (Zahlbr.) Hale – *Lendemer 22084*. Corticolous on *Acer*.
Bulbothrix isidiza (Nyl.) Hale – *Guccion 1644*; *Harris 56009*; *Lendemer 22114*; *Perlmutter 2428*. Corticolous on *Kalmia* and *Vaccinium*.
Byssoloma leucoblepharum (Nyl.) Vain. – *Lendemer 22158*. Corticolous on *Ilex*.
Byssoloma meadii (Tuck.) S. Ekman – *Buck 56132*; *Lay 10-0081*; *Hodkinson 11444*; *Lendemer 22087*. Corticolous on *Magnolia* and *Quercus falcata*.
Canoparmelia caroliniana (Nyl.) Elix & Hale – *Guccion 1645*; *Lendemer 22153*; *Perlmutter 2441*. Corticolous on hardwoods, including *Kalmia*.
Canoparmelia texana (Tuck.) Elix & Hale – *Guccion 1646*; *Harris 56041*; *Lay 10-0085*; *Lendemer 22105*, *22113*, *22044*; *Perlmutter 2430, 2436*. Corticolous on *Acer, Kalmia,* and *Pinus*.
Chaenotheca hygrophila Tibell – *Buck 56137*; *Lendemer 22051*. Corticolous on *Kalmia* and *Pinus*.
Chrysothrix chamaecyparicola Lendemer – *Lendemer 22107*. Corticolous on *Pinus*.
Chrysothrix xanthina (Vain.) Kalb – *Harris 56001*, *56013*; *Lendemer 22099*, *22119*. Corticolous on *Quercus, Pinus* and *Vaccinium*, even growing over other lichens (e.g. *Punctelia*).
Cladonia apodocarpa Robbins – *Perlmutter 2458*. Terricolous on kaolinitic soil of Chalk Cliffs.
Cladonia beaumontii (Tuck.)Vain. – *Lendemer 22094*. Terricolous.
Cladonia botryocarpa G. Merr. (thamnolic acid chemotype) – *Harris 56004*, *56006*; *Lendemer 22126*. Corticolous / lignicolous on *Pinus* stumps and tree bases.
Cladonia caroliniana Tuck. – *Guccion 1647*. Terricolous.
Cladonia cryptochlorophaea Asahina (lacking atronorin) – *Harris 56042*; *Lendemer 22127*. Terricolous.
Cladonia dimorphoclada Robbins – *Harris 56025*; *Lay 10-0093*. Terricolous.
Cladonia hypoxantha Tuck. – *Lendemer 22075*. Corticolous on *Pinus*.

Cladonia leporina Fr. – *Perlmutter 2455*. Terricolous on humus/duff.

Cladonia macilenta Hoffm.var. *macilenta* – *Harris 56032*. Lignicolous on a log.

Cladonia parasitica (Hoffm.) Hoffm. – *Harris 56043*; *Lendemer 22140*; *Schaefer 662*. Corticolous / lignicolous on logs, *Acer* and a decaying *Pinus*.

Cladonia peziziformis (With.) J.R. Laundon – *Harris 56007*. Terricolous on roadbank.

Cladonia rangiferina (L.) F.H. Wigg. – *Lendemer 22132*; *Perlmutter 2451*. Terricolous on sand and humus/duff.

Cladonia ravenelii Tuck. – *Harris 56030*; *Hodkinson 11428*. Corticolous on *Pinus* trunk base.

Cladonia sobolescens Nyl. *ex* Vainio – *Guccion 1648*. Terricolous on soil at Chalk Cliff.

Cladonia strepsilis (Ach.) Grognot – *Harris 56044*; *Lendemer 22141*. Terricolous.

Cladonia subtenuis (Abbayes) Mattick – *Guccion 1649*; *Harris 56039*; *Lendemer 22118*. Terricolous on sand and soil.

Coccocarpia palmicola (Spreng.) Arv. & D.J. Galloway – *Buck 56147*; *Lendemer 22154*. Corticolous on *Quercus*, including trunk base.

Coenogonium luteum (Dicks.) Kalb & Lücking – *Lendemer 22106*. Corticolous on *Pinus*.

Coenogonium sp. – *Buck 56124*; *Harris 56000*. Corticolous on *Kalmia* stem bases and a dead *Quercus*.

Collema callibotrys Tuck. – *Lendemer 22090*. Corticolous / muscicolous on *Quercus* trunk base.

Dibaeis baeomyces (L. f.) Rambold & Hertel – *Guccion 1650*; *Harris 55999*; *Lendemer 22115*; *Perlmutter 2426*. Terricolous on kaolonite soilbank at Chalk Cliffs.

Diploschistes muscorum (Scop.) R. Sant. – *Hodkinson 11425*; *Lendemer 22129*. Lichenicolous on *Cladonia strepsilis* and terricolous on sand.

Fissurina insidiosa C. Knight & Mitt. – *Lendemer 22133*, *22156*. Corticolous on *Carya* and *Ilex*.

Fissurina sp. – *Lendemer 22093*. Corticolous on *Nyssa*.

Graphis inversa R.C. Harris – *Lendemer 22066*. Corticolous on *Acer*.

Graphis lineola Ach. – *Buck 56127*. Corticolous.

Gyalideopsis buckii Lücking, Sérus. & Vezda – *Buck 56143*; *Hodkinson 11436*. Corticolous.

Haematomma accolens (Stirt.) Hillmann – *Buck 56157*; *Lay 10-0049*; *Lendemer 22068*; *Pertlmutter 2442*; *Schaefer 665*. Corticolous on *Acer* and *Quercus*.

Haematomma flexuosum Hillmann – *Harris 56021*. Corticolous on *Quercus*.

Haematomma guyanense Staiger & Kalb – *Lendemer 22067*. Corticolous on *Acer*.

Hertelidea pseudobotryosa R.C. Harris, Ladd & Printzen – *Hodkinson 11431*. Lignicolous.

Heterodermia albicans (Pers.) Swinsc. & Krog – *Lendemer 22065*, *22150A*. Corticolous on *Quercus*, including trunk base.

Heterodermia obscurata (Nyl.) Trevis. – *Lendemer 22151*. Corticolous on *Quercus* trunk base.

Hypotrachyna horrescens (Taylor) Krog & Swinsc. – *Guccion 1654*. Corticolous on fallen branch.

Hypotrachyna minarum (Vain.) Krog & Swinsc. – *Lendemer 22139*. Corticolous on *Acer*.

Hypotrachyna osseoalba (Vain.) Hale – *Guccion 1651*; *Harris 56008*; *Lay 10-0207*; *Lendemer 22122*; *Perlmutter 2439*; *Schaefer 594*. Corticolous on *Quercus* and terricolous on raodbank.

Hypotrachyna spumosa (Asahina) Krog & Swinsc. – *Hodkinson 11440*. Corticolous.

Lecanora cupressi Tuck. –*Buck 56129*; *Hodkinson 11429*; *Lay 10-0050*; *Lendemer 22145*; *Perlmutter 2431*; *Schaefer 658*. Corticolous on *Pinus* branches at Chalk Cliffs.

Lecanora minutella Nyl. – *Harris 56018-A*. Lignicolous on *Pinus* cone scales.

Lecanora strobilina (Spreng.) Kieff. – *Harris 56018*; *Lay 10-0095*. Lignicolous on *Pinus* cone scales.

Lecanora subpallens Zahlbr. – *Lendemer 22060*. Corticolous on *Acer*.

Lecanora sp. – *Buck 56135*. Substrate not recorded.

Lecidea nylanderi (Anzi) Th. Fr. – *Lay 10-0120*. Lignicolous on *Pinus* cone scales.

Lecidea plebeja Nyl. – *Buck 56155*. Lignicolous.

Leiorreuma explicans (Fink) Lendemer – *Perlmutter 2449*. Corticolous on a hardwood trunk.

Leiorreuma sericeum (Eschw.) Staiger – *Buck 56121*, *56136*; *Lendemer 22124*. Corticolous on *Ilex* and *Quercus*.

Lepraria caesiella R.C. Harris – *Lendemer 22055*, *22069, 22109A*. Corticolous on *Nyssa* and *Pinus*.

Lepraria hodkinsoniana Lendemer –*Lendemer 22149*. This is a newly described species restricted to eastern North America, found to be distinct from European populations of *L. incana* (L.) Ach. through molecular study (Lendemer 2011). Corticolous on *Nyssa*.

Lepraria lobificans Nyl. – *Lendemer 22048*, *22078*. Corticolous on *Ilex* and *Quercus*.

Leptogium austroamericanum (Malme) C.W. Dodge – *Buck 56119*; *Lendemer 22108*. Corticolous on *Quercus* trunk base.

Leptogium cyanescens (Rabenh.) Körb. – *Lendemer 22063*. Corticolous on *Acer*.

Loxoxpora pustulata (Brodo & W.L. Culb.) R.C. Harris – *Buck 56146*; *Harris 56002*, *56037*; *Lendemer 22081*. Corticolous on *Acer, Quercus* and an Ericaceae shrub.

Megalospora porphyritis (Tuck.) R.C. Harris – *Lendemer 22086*. Corticolous on *Magnolia*.

Merismatium sp. – *Buck 56123*. Lichenicolous on an unidentified crustose lichen on sandy hardpan in Chalk Cliffs.

Micarea chlorosticta (Tuck.) R.C. Harris – *Buck 56145*. Substrate not recorded.

Multiclavula vernalis (Schwein.) R. Peterson – *Schaefer 552*. Terricolous on trailside soilbank.

Mycocalicium subtile (Pers.) Szatala – *Buck 56141, 56152*. Lignicolous on decorticated *Pinus* trunk.

Mycoporum antecellens (Nyl.) R.C. Harris – *Buck 56160*. Corticolous on *Cyrilla racemosa* stem.

Myelochroa aurulenta (Tuck.) Elix & Hale – *Lendemer 22150*. Corticolous on *Quercus*.

Nadvornikia sorediata R.C. Harris – *Lendemer 22148*. Corticolous on *Nyssa*.

Ochrolechia africana Vain. – *Buck 56139*; *Guccion 1652*; *Harris 56016*; *Lendemer 22117*. Corticolous on *Kalmia* and *Quercus*.

Ochrolechia arborea (Kreyer) Almb. – *Lay 10-0114*; *Lendemer 22116*. Corticolous on *Quercus*.

Opegrapha atra Pers. – *Guccion 1653*; *Lendemer 22059*. Corticolous on *Quercus*.

Opegrapha corticola Coppins & P. James – *Lendemer 22049*. Corticolous on *Carya*.

Opegrapha viridis (Ach.) Behlen & Desberger – *Lendemer 22058*. Corticolous on *Ilex*.

Parmeliopsis subambigua Gyeln. – *Buck 56138*; *Lendemer 22120*. Corticolous on *Pinus*.

Parmotrema hypoleucinum (J. Steiner) Hale – *Guccion 1655*; *Harris 56034*; *Lendemer 22121*; *Schaefer 558*. Corticolous on branches, including *Quercus*.

Parmotrema madagascariaceum (Hue) Hale – *Lendemer 22096*. Corticolous on *Quercus*.

Parmotrema mellissii (C.W. Dodge) Hale – *Lendemer 22080*. Corticolous on *Kalmia*.

Parmotrema perforatum (Jacq.) A. Massal. – *Guccion 1656*; *Perlmutter 2427*. Corticolous, including *Viburnum* branches.

Parmotrema rampoddense (Nyl.) Hale – *Lendemer 22104*. Corticolous on *Acer*.

Parmotrema reticulatum (Taylor) M. Choisy – *Guccion 1657*; *Harris 56010*; *Lendemer 22152*. Corticolous, including *Kalmia* and *Viburnum*.

Parmotrema subisidiosum (Müll. Arg.) Hale – *Harris 56026*, *56036*; *Lendemer 22092*. Corticolous on *Quercus* and *Viburnum*.

Parmotrema submarginale (Michx.) DePriest & B. Hale – *Guccion 1658*; *Harris 56028*. Corticolous, including *Quercus* branches.

Parmotrema tinctorum (Nyl.) Hale – *Harris 56023*. Corticolous on Ericaceae shrub.

Parmotrema ultralucens (Krog) Hale – *Lendemer 22110*. Corticolous on *Quercus*.

Pertusaria commutata Müll. Arg.– *Lendemer 22097*. Corticolous on *Kalmia*.

Pertusaria epixantha R.C. Harris – *Lendemer 22136*. Corticolous on *Acer*.

Pertusaria macounii (I.M. Lamb) Dibben – *Perlmutter 2443*. Corticolous on *Cornus* trunk base.

Pertusaria ostiolata Dibben – *Harris 56011*; *Lendemer 22130*, *22147*. Corticolous on *Cornus* and *Quercus*.

Pertusaria paratuberculifera Dibben – *Buck 56126*; *Harris 56005*; *Lendemer 22053*. Corticolous on *Carya* and *Quercus*.

Pertusaria pustulata (Ach.) Duby – *Perlmutter 2446*. Corticolous on a hardwood trunk.

Pertusaria subpertusa Brodo – *Buck 56148*. Corticolous on *Quercus* trunk.

Pertusaria trachythallina Erichsen – *Buck 56158* (lichexanthone chemotype); *Harris 55998*, *56012*, *56014*. Corticolous on *Quercus* and *Vaccinium*.

Pertusaria velata (Turner) Nyl. – *Lendemer 22074* (UV-). Corticolous on *Quercus*.

Phaeographis inusta (Ach.) Müll.Arg. – *Hodkinson 11441*; *Lendemer 22062*. Corticolous, including on *Acer*.

Phaeographis subtinigra (Vain.) Zahlbr. (Syn. *Phaeographis brasiliensis*) – *Lay 10-0131*. Corticolous.

Phlyctis boliviensis Nyl. (Syn. *Phlyctis ludoviciensis*) – *Lendemer* 22085. Corticolous on *Magnolia*.

Phyllopsora confusa Swinscow & Krog – *Lendemer 22064*. Corticolous on *Quercus* trunk base.

Phyllopsora kalbii Brako – *Hodkinson 11447*. Corticolous.

Physcia americana G. Merr. – *Lendemer 22091*. Corticolous on *Quercus*.

Piccolia nannaria (Tuck.) Lendemer & Beeching – *Hodkinson 11434*. Corticolous.

Placidium arboreum (Schw. *ex* E. Michener) Lendemer – *Buck 56150*; *Lendemer 22071*; *Perlmutter 2437*. Corticolous / muscicolous on *Quercus* trunk base.

Placynthiella oligotropha (J.R. Laundon) Coppins & P. James – *Harris 55997*. Terricolous.

Polymeridium proponens (Nyl.) R.C. Harris (UV-) – *Lendemer 22157*. Corticolous on *Ilex*.

Polymeridium quinqueseptatum (Nyl.) R.C. Harris – *Lendemer 22125*. Corticolous on *Ilex*.

Porina scabrida R.C. Harris – *Lendemer 22079*. Corticolous on *Quercus*.

Protoparmelia isidiata Diederich, Aptroot & Sérus. – *Hodkinson 11437*; *Lendemer 22089*. Corticolous on *Kalmia*.

Pseudosagedia cestrensis (Tuck. *ex* E. Michener) R.C. Harris – *Lendemer 22102*; *Perlmutter 2445*. Corticolous on hardwoods including *Acer*.

Punctelia rudecta (Ach.) Krog – *Lendemer 22054*. Corticolous on *Carya*.

Pycnothelia papillaria Dufour – *Lendemer 22131*; *Perlmutter 2453*. Terricolous on sandy soil.

Pyrenula citriformis R.C. Harris – *Buck 56159*; *Lendemer 22047*, *22101*. Corticolous on *Acer* and *Ilex*.

Pyrenula cruenta (Mont.) Vain. – *Lendemer 22045*. Corticolous on *Ilex*.

Pyrrhospora varians (Ach.) R.C. Harris – *Guccion 1660*. Corticolous on fallen branch.

Pyxine albovirens (G. Mey.) Aptroot – *Lendemer 22073*. Corticolous on *Quercus*.

Pyxine subcinerea Stirton – *Guccion 1661*. Corticolous on fallen branch.

Ramboldia blochiana Lendemer & R.C. Harris – *Harris 56040*. This sorediate crustose lichen was described as new to science by Lendemer and Harris (2011). Corticolous on *Vaccinium*.

Ramboldia russula (Ach.) Kalb, Lumbsch & Elix – *Hodkinson 11438*; *Lendemer 22115*. Corticolous including on *Kalmia*.

Ramonia microspora Vezda – *Lendemer 22061*. Corticolous on *Acer*.

Sarcographa tricosa (Ach.) Müll. Arg. – *Lendemer 22100*. Corticolous on *Acer*.

Schismatomma glaucescens (Nyl. *ex* Willey) R.C. Harris – *Lendemer 22160*. Corticolous on *Quercus*.

Scoliciosporum chlorococcum (Stenh.) Vězda – *Lay 10-0116, 10-0160*. Corticolous on branches.

Strigula americana R.C. Harris – *Lendemer 22077*. Corticolous on *Quercus*.

Strigula phaea (Ach.) R.C. Harris – *Buck 56131*; *Lendemer 22052*. Corticolous on *Quercus* trunk base.

Strigula smaragdula Fr. – *Buck 56151*; *Lendemer 22088*; *Perlmutter 2438*. Foliicolous on *Magnolia grandifolia* leaves.

Trapeliopsis flexuosa (Fr.) Coppins & P. James – *Buck 56128*; *Lendemer 22095*. Lignicolous.

Trypethelium tropicum (Ach.) Müll.Arg. – *Lendemer 22044, 22103*; *Perlmutter 2434*, *2447*. Corticolous on hardwoods including *Acer* and *Ilex*.

Trypethelium virens Tuck. – *Lendemer 22056*; *Perlmutter 2448*. Corticolous on *Ilex*.

Tuckermanella fendleri (Nyl.) Essl. – *Buck 56140*. Corticolous on *Pinus* twig.

Usnea mutabilis Stirt. – *Guccion 1662*; *Harris 56019*, *56029*; *Lendemer 22098*; *Schaefer 564*. Corticolous on *Quercus* and *Ulmus*.

Usnea pensylvanica Motyka – *Harris 55996*; *Hodkinson 11439*. Corticolous, including on *Ulmus alata*.

Usnea subscabrosa Motyka – *Buck 56149*; *Harris 56038*; *Hodkinson 11426*; *Lendemer 22083*. Corticolous on *Quercus*.

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APPENDIX A – TABLES 1-4

Table 1. Jaccard indices of similarity between the three sites visited during the 19th Tuckerman Lichen Workshop in South Carolina, 2010.

	Stevens Creek	Savannah River Bluffs
Hitchcock Woods	0.25	0.19
Steven's Creek		0.24

Table 2. Lichen biota composition by habit (growth form) among three sites in South Carolina, 2010.

Site	Crustose*	Foliose	Fruticose**
Stevens Creek	55 (58%)	19 (20%)	20 (22%)
Savannah River Bluffs	89 (71%)	30 (24%)	5 (4%)
Hitchcock Woods	88 (59%)	32 (22%)	28 (19%)
Combined	164 (64%)	49 (19%)	40 (16%)

*inlcudes leprose habits.
**includes squamulose and dimorphic habits.

Table 3. Lichen biota composition by substrate among three sites in South Carolina, 2010.*

Site	Bark	Rock	Soil	Wood	Moss	Leaf	Lichen
Stevens Creek	63 (68%)	12 (13%)	7 (8%)	8 (9%)	1 (1%)	0	0
Savannah River Bluffs	91 (73%)	34 (27%)	1 (1%)	1 (1%)	1 (1%)	0	0
Hitchcock Woods	119 (80%)	0	18 (14%)	10 (7%)	2 (1%)	1 (1%)	2 (1%)
Combined	181 (71%)	40 (16%)	19 (7%)	17 (7%)	4 (2%)	1 (<1%)	2 (1%)

*Site totals may be > 100% due to some species found on multiple substrates.

Table 4. Largest families (≥ 5% of lichen biota) represented among three sites in South Carolina, 2010.

Rank	Stevens Creek	Savannah River Bluffs	Hitchcock Woods	Compiled
1	Parmeliaceae (17%)	Parmeliaceae (16%)	Parmeliaceae (18%)	Parmeliaceae (13%)
2	Cladoniaceae (13%)	Physciaceae (13%)	Cladoniaceae (11%)	Graphidaceae (9%)
3	Pertusariaceae (10%)	Graphidaceae (10%)	Graphidaceae (8%)	Physciaceae (9%)
4	Physciaceae (9%)	Lecanoraceae (6%)	Physciaceae (7%)	Cladoniaceae (8%)
5	Lecanoraceae (5%)	Rocellaceae (6%)	Pertusariaceae (6%)	Lecanoraceae (5%)
6		Ramalinaceae (5%)	Lecanoraceae (5%)	Pertusariaceae (5%)

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On the perplexing variability of reproductive modes in the genus *Ochrolechia*: Notes on *O. africana* and *O. arborea* in eastern North America

IRWIN M. BRODO[1] & JAMES C. LENDEMER[2]

ABSTRACT. – Notes on the discovery of several rare, reproductively atypical populations of *Ochrolechia africana* and *O. arborea* in eastern North America are presented. Sorediate fertile populations of the typically esorediate and fertile species *O. africana* were found in the Coastal Plain of southeastern North America. Conversely fertile sorediate populations of *O. arborea*, a species that is typically sterile and sorediate, were found in Maine and Pennsylvania, U.S.A. The unusual populations are described in detail and their geographic distributions mapped within the context of the reproductively typical populations of each species. A discussion of the labile nature of reproductive modes in *Ochrolechia* species is presented. The positive hypochlorite reaction in the amphithecial medulla and presence of 4,5-di-*O*-methylhiascic acid in the apothecia, together with the presence of lichexanthone in all tissues, point to a close relationship of *O. arborea* with *O. mexicana*.

KEYWORDS. – *Ochrolechia mexicana*, sterile crusts, hiascic acids.

INTRODUCTION

Many sorediate crustose lichens that are typically found in their sterile state (i.e., without apothecia or perithecia) are occasionally encountered with fruiting bodies (Lendemer & Knudsen 2010; Tønsberg 1992). This phenomenon can be quite rare, however, and a non-trivial proportion of sterile asexually reproducing lichens have never been found in a fertile state (Fryday & Coppins 1997; Lendemer 2011). Such lichens have either been left undescribed, and thus obscured from the scientific dialogue, or have been classified provisionally in a genus based on correlated chemistry or superficial resemblance to known fertile species (Timdal 2001). In the event that these taxa have later been found in a fertile state, they have frequently had to be reclassified since the higher level taxonomic scheme for lichen-forming fungi relies largely on sexual characters.

Such was the case with *Ochrolechia arborea* (Kreyer) Almb., a species that is common and widespread in some parts of temperate eastern North America (Brodo 1991). Originally the taxon was described as a variety of *Variolaria lactea* (L.) Pers. (= *Pertusaria lactea* (L.) Arnold). Later, Almborn (1952) combined it in the genus *Ochrolechia* based on the discovery of apothecia in Russian specimens, adding that he did not find them in Scandinavian material. Verseghy (1962) did not mention apothecia in her description of the species, and neither Tønsberg (1992) nor Brodo (1991) report seeing any fertile material in Norway and North America, respectively. In describing the apothecia in Russian specimens, Kopaczevskaja et al. (1971:253) said only that they were "encountered very rarely" and the discs were flat, reddish and naked, with thalline margins that are quite thin and entire (no spores were observed). Recently, Kukwa (2011) reported the occurrence of apothecia in two specimens of *O. arborea*, one each from Russia and Sweden. The anatomy of these specimens was not studied in detail however, due to the few apothecia present on the thalli.

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When both of the authors of the present contribution independently discovered fertile populations of *Ochrolechia arborea* in eastern North America, we decided to study the material in detail and report our findings in the hope of better understanding the relationships of this species to its congeners. Concurrently, the second author (JCL), together with Richard Harris, uncovered the existence of a handful of sorediate populations of the usually esorediate and fertile species, *O. africana* Vain., from southeastern North America. Since sorediate populations of *O. africana* do not appear to have previously been reported from this portion of the continent, we decided to also detail this discovery in the present contribution. The present reports of reproductively atypical populations of normally sterile sorediate and fertile esorediate species fit well within the context of *Ochrolechia*, where the phenomenon appears to be widespread (for discussion see Brodo (1991) and Kukwa (2011)). However, these reports nonetheless highlight the difficulties in working with sterile asexually reproducing crustose lichens.

METHODS

Specimens were examined with standard microscopic techniques. Spores and soredia were examined and measured in water. Microtome sections (10-15 µm) were made of a mature apothecium using a Physitemp BFS Series freezing stage with an AO Spencer microtome. The sections were mounted in lactophenol with cotton blue cytoplasmic stain. Anatomical features were examined and measured in the stained sections.

Thin layer chromatography was performed using solvents A, B' and C as given in Orange et al. (2001) guided by Table 3 in Brodo (1991), where the depsides found in *Ochrolechia* are compared. With the fertile specimens of *O. arborea*, the apothecia, carefully cleaned of attached thalline material, were analyzed separately from fragments of thalli bearing no apothecia in order to determine the location of the various secondary compounds. Similarly, with the sorediate specimens of *O. africana,* soraliate fragments of the thallus were chromatographed separately from the apothecia.

Light micrographs (LMs) were produced following Lendemer (2011a). Specimens cited in this contribution are deposited in NY and/or CANL. Label data for the former specimens have been digitized and are available via the C.V. Starr Virtual Herbarium of The New York Botanical Garden (http://sciweb.nybg.org/science2/hcol/lena/index.asp.html).

RESULTS

I - DESCRIPTIONS OF THE SPECIES

Detailed accounts of the unusual populations of *Ochrolechia arborea* and *O. africana* are provided below. Additionally, a key is provided in order to facility the identification of corticolous sorediate *Ochrolechia* populations from eastern North America. Discussion of the relationships between the species, and others in the genus, is provided in a section following the descriptions and key.

1. *Ochrolechia africana* Vain., Ann. Univ. fenn. Aboënsis, ser. A, 2(3): 3. 1926. TYPE [*fide* Brodo (1991)]: **SOUTH AFRICA:** "Durban Trunk of tree. 1921, *van der Bijl 136*" (TUR-V 34315!, holotype).

DESCRIPTION OF SOREDIATE THALLI (FIG. 1). – Thallus well developed, thin to thick, continuous and rugulose to rimose, bearing discrete soralia, mostly round but some irregular in shape, excavate to hemispherical; soredia greenish, very fine, 7.5-12(-17) µm in diameter.

CHEMISTRY OF SOREDIATE THALLI. – Thallus cortex C-, UV± yellow; medulla and soralia C+ pink, UV± yellow. Apothecial cortex C-, UV± yellow; amphithecial medulla and epihymenium C+ pink, UV± yellow.

All four cited specimens contain gyrophoric acid (major), 5-*O*-methylhiascic acid (major), lecanoric acid (minor). Three of the four (all except *Harris 43419*) also contained major or minor amounts of lichexanthone (thallus UV+ yellow). All of these substances were found in both the apothecia and the thallus (including soralia).

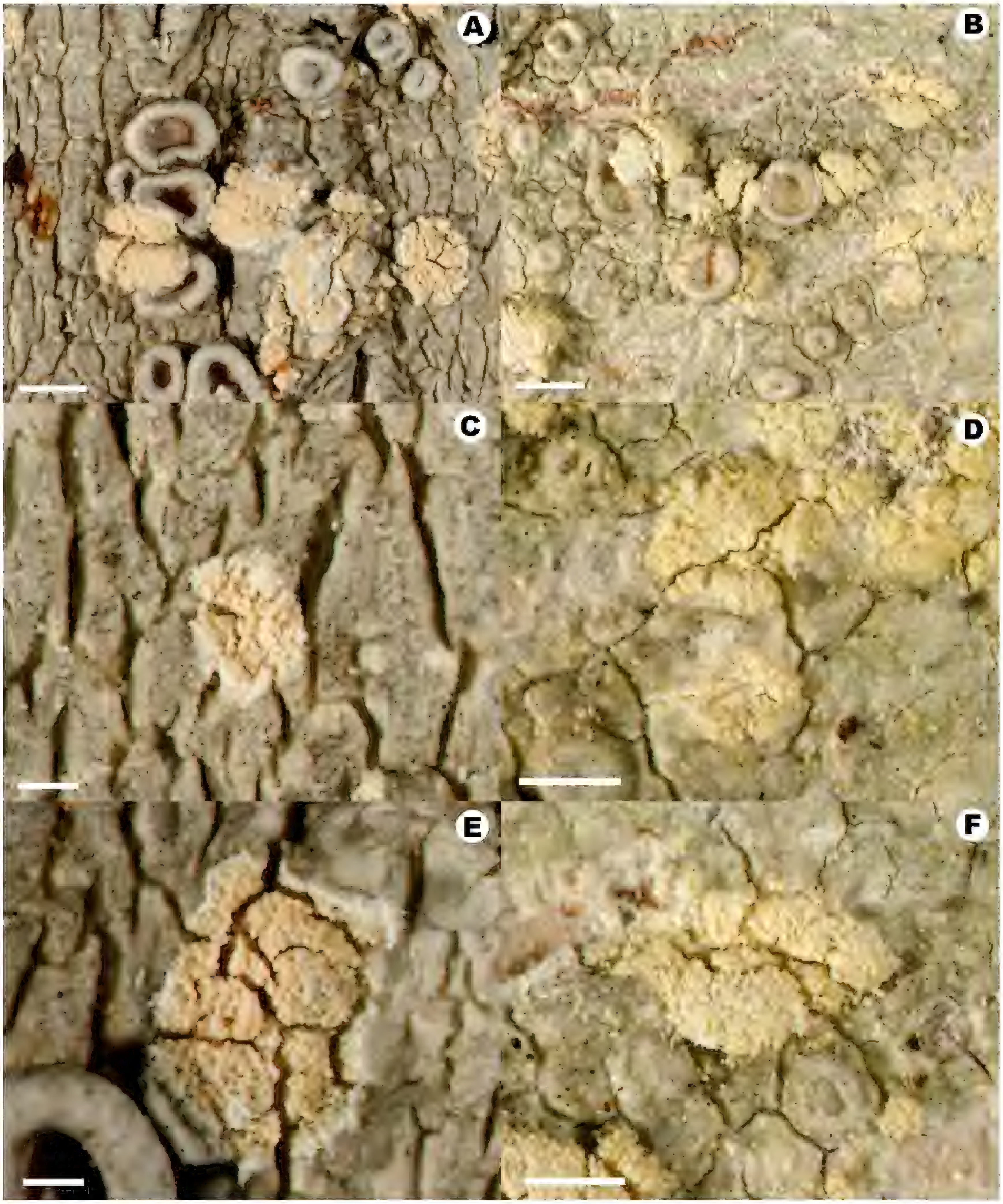

Figure 1, morphology of sorediate populations of *Ochrolechia africana* (left [A, C, E], UV- chemotype from *Harris 43419*; right [B, D, F], UV+ chemotype from *Harris 39972*). A-B, gross morphology of the thallus and apothecia (scales = 1.0 mm). C-F, detail of the soralia (scales = 0.5 mm in D & F, 0.25 in C & E).

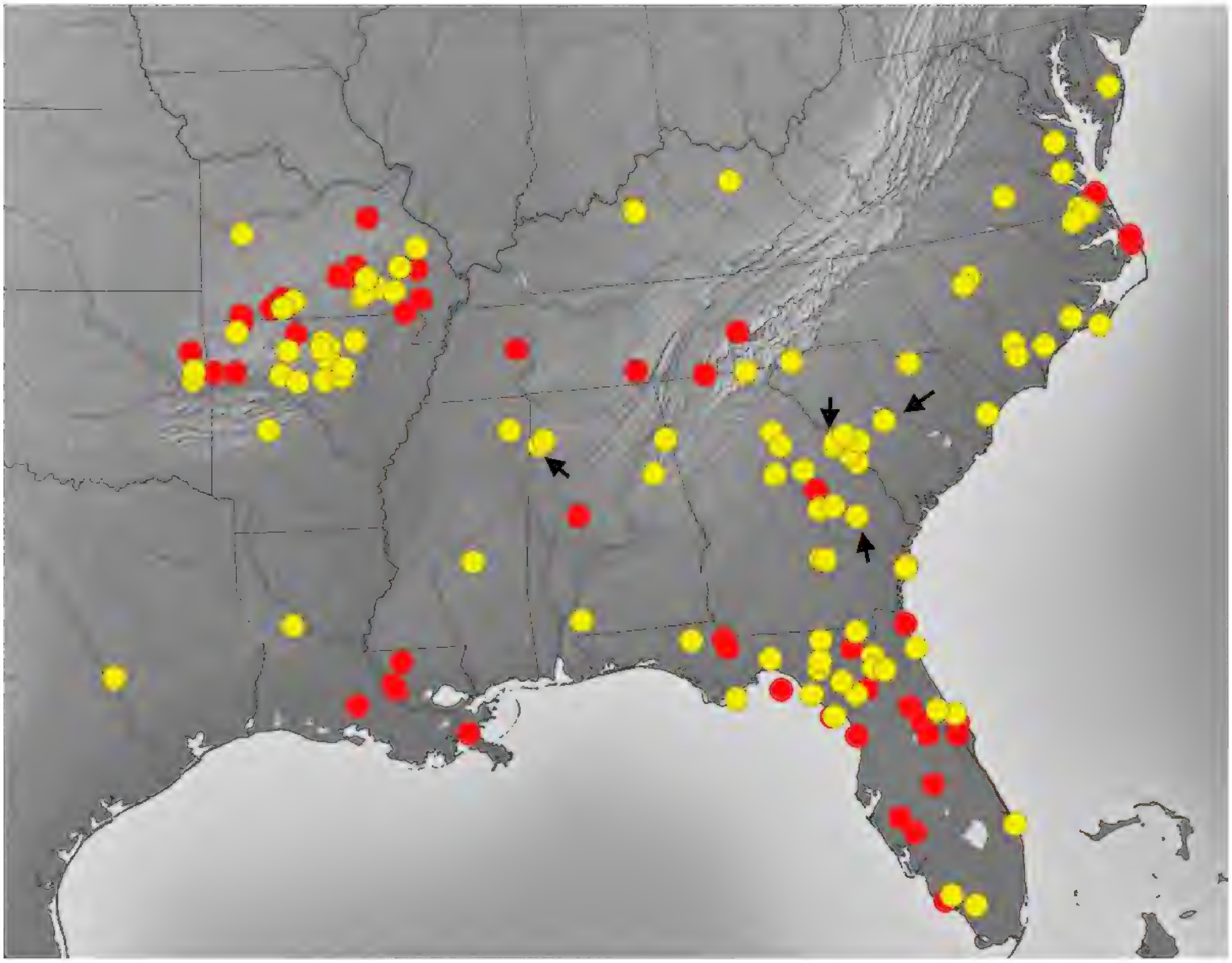

Figure 2, geographic distribution of *Ochrolechia africana* in North America based on specimens examined for this study (yellow dots = populations with lichexanthone detectable by UV; red dots = populations with lichexanthone not detectable by UV; arrows point to sorediate populations).

ECOLOGY AND DISTRIBUTION. – This species is common and widespread throughout the subtropical and tropical regions of North America, especially in the southeastern Coastal Plain (Brodo 1991; and fig. 2 herein). The distribution extends northward up the Mississippi River embayment into the Ozarks, and as far north as Massachusetts in the Coastal Plain. The sorediate populations are scattered throughout the range of the species and are found on a variety of deciduous trees (figure 2, see arrows).

NOTES. – Although the soralia found on specimens of *Ochrolechia africana* vary from round and hemispherical, virtually capitate, to irregular in shape and somewhat excavate, the soredia within the soralia are uniformly tiny and powdery, no more than 20 µm in diameter. Because we observed some variation in soralium shape even on the same thallus, this character does not seem to be a fundamental feature of this rare morphotype. Nonetheless, the fine soredia and C- reaction of the thallus cortex should readily distinguish the sorediate morphotype of *O. africana* from both *O. arborea* and *O. mexicana*.

Sorediate specimens examined. – **U.S.A. ALABAMA.** MARION CO.: North Fork Creek, on W side of US 43, 4.x.1993, on *Prunus*, *R.C. Harris 43419* (NY, UV- chemotype). **GEORGIA.** CANDLER CO.: Fifteenmile Creek Preserve, uplands above E shore of Fifteenmile Creek, 22.xii.2009, on *Quercus*, *J.C. Lendemer et al. 21652* (NY, UV+ chemotype). COLUMBIA CO.: Burks Mountain, ~3.5 mi E of US 221 from Pollards Corner on road through Rosemont, 12.iii.2010, on vine, *R.C. Harris 55917* (NY, UV+ chemotype). **SOUTH CAROLINA.** RICHLAND CO.: Fort Jackson Army Base, Buffalo Creek Natural Area, 13.iii.1997, on *Acer*, *R.C. Harris 39972* (NY, UV+ chemotype).

Selected esorediate specimens examined (UV+ populations). – **U.S.A. ALABAMA.** BALDWIN CO.: Shelbey's, 17.iii.1925, on trees, *A.W. Evans 296* (NY). CHEROKEE CO.: Wolfden Flats, off CR45, 3.x.1999, on bark, *W.R. Buck 36391* (NY). ESCAMBIA CO.: Little River State Forest, 12.iv.2007, on *Liriodendron*, *R.C. Harris 53340* (NY). MARION CO.: North Fork Creek, on W side of US43, 4.x.1999, on bark, *W.R. Buck 36437* (NY). MORGAN CO.: near Beaver Creek Swamp Wildlife Refuge, 2.i.2011, on fallen branch, *E. Tripp 1309* (NY). **ARKANSAS.** CLEBURNE CO.: N portion of North Unit of Big Creek Natural Area, 9.x.2010, on *Liquidambar*, *J.C. Lendemer 26376 & D. Ladd* (NY). CONWAY CO.: Ozark National Forest, Cedar Mountain, 8.xi.2002, on bark, *A. Amtoft 640* (NY). GARLAND CO.: Ouachita National Forest, W side of North Fork Ouachita River, ~0.1 mi S of AR298, 6.x.2010, on *Ulmus*, *J.C. Lendemer et al. 26129* (NY). INDEPENDENCE CO.: Cherokee Wildlife Management Area, 29.iii.2006, on sapling, *R.C. Harris 52363* (NY). JEFFERSON CO.: Pine Bluff Arsenal, along S side of Arkansas River, 3.xii.1999, on *Liquidambar*, *D. Ladd 22077 & M. Pederson* (NY). SEARCY CO.: Buffalo National River, N of Woolum Campground along CR15, 17.iv.2005, on bark, *R.C. Harris 51037* (NY). SHARP CO.: Strawberry River Preserve, off Barnes Rd. (CR9), 25.x.2001, on bark, *W.R. Buck 40493* (NY). **DELAWARE.** SUSSEX CO.: Delaware Wild Lands Cypress Swamp Conservation Area, 26.x.1989, on *Acer*, *R.C. Harris 24951* (NY). **FLORIDA.** CALHOUN CO.: along S side FL 20 ~8 E if Bay Co. line, 30.xi.1988, on bark, *R.C. Harris 23062A* (NY). CLAY CO.: Gold Head Branch State Park, 28.xii.1992, on ericaceous shrub, *R.C. Harris 29131-A* (NY). FRANKLIN CO.: along FL 65, 0.8 mi N of US 98, 3.v.1990, on *Pinus*, *R.C. Harris 25000* (NY). GILCHRIST CO.: Waccasassa Flats, 5.xii.1993, on bark, *W.R. Buck 24452* (NY). JEFFERSON CO.: E of SR 59, 8.4 mi S Wacissa city limits, 12.xii.1993, on bark, *W.R. Buck 24870* (NY). LEVY CO.: Cedar Key Scrub State Preserve, 30.xi.1992, on bark, *R.C. Harris 29335* (NY). OKALOOSA CO.: along Antioch Rd. (CR 4) 1.2 mi W of FL 85, 5.v.1990, on bark, *R.C. Harris 25188* (NY). SANTA ROSA CO.: Blackwater River State Forest, along Jackson Red Ground Trail N from Red Rock Rd., 9.xii.1993, on bark, *W.R. Buck 24660* (NY). VOLUSIA CO.: Turtle-Mound, S of New Smyrna, 1.iv.1921, on bark, *J.K. Small 10355A* (NY). **GEORGIA.** BURKE CO.: Boggy Gut Creek tract, N of GA56 Spur, 15.iii.2010, on *Quercus*, *R.C. Harris 56084* (NY). COLUMBIA CO.: Burks Mountain, 12.iii.2010, on *Prunus*, *R.C. Harris 55922* (NY). EMANUEL CO.: Ohopee Dunes Natural Area, 19.xii.2009, on *Quercus*, *J.C. Lendemer 21208 & S.Q. Beeching* (NY). GREENE CO.: Oconee National Forest, end of FS1202, on *Acer*, *R.C. Harris 38880* (NY). HANCOCK CO.: along GA15, ~5 mi NW of Washington County line, 8.x.1999, on *Ulmus*, *R.C. Harris 43666* (NY). LAURENS CO.: Laurens County Public Fishing Area, 8.x.1999, on *Liquidambar*, *R.C. Harris 43616* (NY). McINTOSH CO.: Sapelo Island, behind Nanny Goat Beach, 15.xii.2009, on *Juniperus*, *J.C. Lendemer 20771* (NY). PUTNAM CO.: Oconee National Forest, end of FS1108, 16.ix.1996, on bark, *W.R. Buck 30464* (NY). RICHMOND CO.: Phinizy Swamp Nature Park, 15.iii.2010, on *Prunus*, *J.C. R.C. Harris 56124* (NY). **KENTUCKY.** BATH CO.: Daniel Boone National Forest, Stony Cove Recreation Area, 10.x.1995, on *Ulmus*, *R.C. Harris 36906* (NY). NELSON CO.: Bernheim Arboretum and Research Forest, ~6 mi NW of Bardstown, 23.x.2002, on rock, *D. Ladd 23986* (NY). **LOUISIANA.** NATCHITOCHES PARISH: Kisatchie National Forest, Longleaf Trail Vista, 27.iii.1982, on bark, *J. Pruski 2485* (NY). **MISSISSIPPI.** ITAWMBA CO.: Donivan Slough, 28.ix.1992, on *Quercus*, *R.C. Harris 28612* (NY). SCOTT CO.: Bienville National Forest, Bienville Pines Scenic Area, 29.ix.1992, on fallen branch, *R.C. Harris 28726* (NY). **MISSOURI.** CARTER CO.: Mark Twain National Forest, E side of Pump Hollow, 16.x.2003, on *Ulmus*, *R.C. Harris 48540* (NY). MADISON CO.: Amidon Memorial Conservation Area, Castor River Shut-Ins Natural Area, 21.x.2001, on *Ulmus*, *R.C. Harris 45080* (NY). OZARK CO.: Mark Twain National Forest, along ridge E of Waterhole Hollow, 19.c.2003, on *Carya*, *R.C. Harris 47425* (NY). SHANNON CO.: Shut-In Mountain Fens Preserve, 13.vii.1990, on *Carpinus*, *D. Ladd 14107* (NY). TANEY CO.: Mark Twain National Forest, Hercules Glades Wilderness, 20.v.2003, on bark, *W.R. Buck 44511* (NY). WAYNE CO.: Sam A. Baker State Park, Mudlick Mountain, 15.x.2003, on *Carya*, *W.R. Buck 45308* (NY). **NORTH CAROLINA.** CAMDEN CO.: Dismal Swamp State Park, S of Kim Saunders Ditch, 13.xii.2009, on *Acer*, *J.C. Lendemer et al. 20523* (NY). CHATHAM CO.: Lower Haw River State Natural Area, Pegg Property, 6.v.2007, on hardwood, *G.B. Perlmutter 958 & S. King* (NY). GATES CO.: Merchants Millpond State Park, 11.xii.2009, on *Quercus*, *J.C. Lendemer 20357 & F. Williams* (NY). JONES CO.: Croatan National Forest, Catfish Lake South Wilderness, E of Mattocks Rd., 17.iii.2003, on bark, *W.R. Buck 43718* (NY). ORANGE CO.: Mason Farm Biological Reserve, Plot 6, 13.iv.2007, on *Cercis*, *G.B. Perlmutter et al. 918* (NY). PENDER CO.: Holly Shelter Game Land, just E of Shaw Highway (SR1523), 18.iii.2003, on *Quercus*, *R.C. Harris 47140* (NY). **OKLAHOMA.** ADAIR CO.: Cookson Hills Wildlife Management Area, 1.xi.2000, on *Amelanchier, R.C. Harris 44477-B* (NY). SEQUOYAH CO.: Sallisaw-Brushy Lake State Park, 31.x.2000, on *Celtis*, *D. Ladd 22492* (NY). **SOUTH CAROLINA.** AIKEN CO.: The Hitchcock Woods, just SW of Aiken, 14.iii.2010, on *Kalmia*, *W.R. Buck 56139* (NY). EDGEFIELD CO.: Sumter National Forest, along FSR634, 17.iii.1997, on bark, *W.R. Buck 31673* (NY). LANCASTER CO.: Forty Acre Rock, ~2 mi W of Taxahaw, 15.iii.1997, on *Juniperus*, *R.C. Harris 40172* (NY). LEXINGTON CO.: Peachtree Rock Nature Preserve, 13.iii.1997, on bark, *W.R. Buck 31410* (NY). NEWBERRY CO.: Sumter National Forest, Buncombe Trail, 15.iii.1997, on fallen branch, *R.C. Harris 40128* (NY). PICKENS CO.: Lookout Trail to Eastatoe Creek National Heritage Preserve, 27.ix.1989, on *Acer*, *R.C. Harris 24823* (NY). **TENNESSEE.** POLK CO.: Cherokee National Forest, along FSR62 at Sheeds Creek, 5.x.1998, on bark, *W.R. Buck 34813* (NY). **TEXAS.** BRAZOS CO.: Bryan, iii.1921, on bark, *N.L.T. Nelson s.n.* (NY). **VIRGINIA.** CHEASPEAKE CITY: Dismal Swamp National Wildlife Refuge, E of Laurel Ditch, 13.xii.2009, on fallen branch, *J.C. Lendemer et al. 20573* (NY). ESSEX CO.: 2.5 mi W of Montague, 15.iv.1963, on bark, *C.F. Reed 61888* (NY). NOTTOWAY CO.: 3 mi SW of Blackstone, 27.x.1962, on *Quercus*, *C.F. Reed 59490* (NY). SUFFOLK CITY: Dismal Swamp National Wildlife Refuge, 12.xii.2009, on fallen branch, *J.C. Lendemer 20387 & B.P. Hodkinson* (NY). WILLIAMSBURG CITY: College of William & Mary, 18.vi.2004, on *Magnolia*, *B.P. Hodkinson 300* (NY).

Selected esorediate specimens examined (UV- populations). – **U.S.A. ALABAMA.** BIBB CO.: Talladega National Forest, Oakmulgee Wildlife Management Area, 1.x.1992, on *Acer*, *R.C. Harris 28884* (NY). MARION CO.: North Fork Creek, on W side of US43, 4.x.1999, on *Gaylussacia*, *W.R. Buck 36423* (NY). **ARKANSAS.** BENTON CO.: Hobbs State Park-Conservation Area, 16.x.2005, on *Amelanchier*, *R.C. Harris 51737* (NY). CARROLL CO.: along US62 just NE of the White River, 2.xi.2000, on *Ulmus*, *R.C. Harris 44648-A* (NY). FRANKLIN CO.: Ozark National Forest, Boston Mountain Ranger District, Shores Lake, 17.x.2005, on fallen branch, *R.C. Harris 51751* (NY). INDEPENDENCE CO.: Cherokee Wildlife Management Area, 29.iii.2006, on bark, *W.R. Buck 50002* (NY). MARION CO.: vicinity of Crooked Creek, 1.9 mi W of Yellville, 25.iv.1988, on *Juniperus*, *R.C. Harris 21530* (NY). **FLORIDA.** ALACHUA CO.: Paynes Prairie State Preserve, Bolen Bluff Trail off US 441, 1.xii.1992, on *Quercus*, *R.C. Harris 29474* (NY). COLUMBIA CO.: Osceola National Forest, along FL 250, ½ mi SW of overpass at I-10, 2.i.1991, on bark, *W.R. Buck 19066* (NY). DUVAL CO.: Big Talbot Island State Park, 17.xii.1988, on *Quercus*, *R.C. Harris 23905* (NY). LEON CO.: Apalachicola National Forest, Leon Sinks Geological Area, 2.xii.1988, on *Quercus*, *R.C. Harris 23268A* (NY). LEVY CO.: Cedar Key Scrub State Preserve, 30.xi.1992, on *Ilex*, *R.C. Harris 29348* (NY). SANTA ROSA CO.: Blackwater River State Forest, along Jackson Red Ground Trail from Red Rock Road, 9.xii.1993, on *Quercus*, *R.C. Harris 31974-A* (NY). TAYLOR CO.: Aucilla Wildlife Management Area, Aucilla Sinks, 12.xii.1993, on fallen branch, *R.C. Harris 32290* (NY). WALTON CO.: Lakewood Park, along CR 1087, 30.xi.1988, on bark, *R.C. Harris 23092* (NY). **GEORGIA.** COFFEE CO.: Broxton Rocks Ecological Preserve, Ricketson Tract, 18.ix.1996, on *Quercus*, *R.C. Harris 38805* (NY). COLUMBIA CO.: Burks Mountain, 12.iii.2010, on *Quercus*, *J.C. Lendemer 21886* (NY). McINTOSH CO.: Sapelo Island, Middle Rd. 0.25 mi S of jct w/ Rogers Marsh Rd., 16.xii.2009, on *Quercus*, *J.C. Lendemer 20940* (NY). RICHMOND CO.: Phinizy Swamp Nature Park, 15.iii.2010, on *Acer*, *J.C. Lendemer 22187-A* (NY). WASHINGTON CO.: ~3 mi N of Harrison along CR206, 18.iii.1995, on *Acer*, *W.R. Buck 27550* (NY). **KENTUCKY.** BULLITT CO.: Bernheim Arboretum and Research Forest, ~10 mi SE of Shepherdsville, 25.iii.2002, on *Cercis*, *D. Ladd 23426 & M. Ladd* (NY). **LOUISIANA.** EAST BATON ROUGE PARISH: Burden Research Plantation, Essen Lane, 31.v.1975, on oak, *S.C. Tucker 14182* (CANL, NY). EAST FELICINA PARISH: Idlewild Agricultural Experimental Station, 16.iii.1979, on hardwood, *S.C. Tucker 18442-A* (NY). PLAQUMINES PARISH: Pointe a la Hache, ix.1884, on *Celtis*, *A.B. Langlois x81* (NY). ST. MARTIN PARISH: near St. Martinville, 28.i.1889, on bark, *A.B. Langlois 24* (NY). **MISSISSIPPI.** ITAWMBA CO.: Donivan Slough, 28.ix.1992, on *Quercus*, *R.C. Harris 28701* (NY). **MISSOURI.** BARRY CO.: Roaring River State Park, 3.xi.2000, on *Juniperus*, *D. Ladd 22669* (NY). BUTLER CO.: Big Cane Conservation Area, 23.x.2001, on *Fraxinus*, *R.C. Harris 45271* (NY). CHRISTIAN CO.: Mark Twain National Forest, N of Turkey Creek, Rd., 21.v.2003, on *Juniperus*, *R.C. Harris 47693* (NY). OREGON CO.: Mark Twain National Forest, Greer Spring Trail, 18.x.2003, on fallen branch, *R.C. Harris 48717* (NY). SHANNON CO.: Shut-In Mountain Fens Preserve, 2.iii.1991, on *Diospyros*, *D. Ladd 14837* (NY). TANEY CO.: Boston Ferry Conservation Area, 5.xi.2002, on *Ulmus*, *R.C. Harris 46773* (NY). TEXAS CO.: Gist Ranch Conservation Area, 4.xi.2004, on sapling, *R.C. Harris 50279-A* (NY). **NORTH CAROLINA.** BLADEN CO.: S of NC41 along N shore of Bay Tree Lake, 15.vi.2002, on *Acer*, *W.R. Buck 41898* (NY). CARTERET CO.: Cape Lookout National Seashore, Shackleford Banks, 19.iii.2003, on bark, *R.C. Harris 47173* (NY). DARE CO.: Roanoke Island, along NC345 ~1.5 mi S of US64, 29.ix.1993, on *Magnolia*, *R.C. Harris 31061* (NY). **OKLAHOMA.** CHEROKEE CO.: J.T. Nickel Family Nature and Wildlife Preserve, 30.x.2000, on *Acer*, *R.C. Harris 44272* (NY). SEQUOYAH CO.: Sallisaw-Brushy Lake State Park, 1.xi.2000, on *Juniperus*, *W.R. Buck 38654* (NY). **TENNESSEE.** BLOUNT CO.: Great Smoky Mountains National Park, Hess Creek, 30.vi.2010, on *Acer*, *E.A. Tripp et al. s.n.* (NY). FRANKLIN CO.: Sewanee, 7.ii.2010, on *Quercus*, *C. Parrish 43* (NY). HENDERSON CO.: Natchez Trace State Park, 4.vi.1976, on *Juniperus*, *R.C. Harris 11601* (NY). **VIRGINIA.** VIRGINIA BEACH CITY: Rt. 165 near Kempsville, 16.iv.1963, on *Carya*, *C.F. Reed 61980* (NY).

2. *Ochrolechia arborea* (Kreyer) Almb., Bot. Notiser, 105: 254. 1952.

Variolaria lactea var. *arborea* Kreyer, Acta Horti Petropl., 21: 321. 1913. TYPE: **BELARUS:** "ad corticem Alni incanae prope Smoliany et ad corticem Pini sylv. Prope Dobrusch in prov. Mohilew", xii.1912, *V.P. Savicz s.n.* (LE[n.v.], lectotype (selected by Kukwa (2011)).

Variolaria arborea (Kreyer) L.I. Savicz, Izv. Bot. Sada Petra Velikago, 14: 48. 1914.

Pertusaria lactea f. *arborea* (Kreyer) Zahlbr., Cat. Lich. Univ. 5: 162. 1928.

Pertusaria arborea (Kreyer) Zahlbr., Cat. Lich. Univ., 8: 520. 1932.

DESCRIPTION OF FERTILE THALLI. – *Thalli* of the fertile specimens were entirely typical of the species (Brodo 1991): thin to rather thick, smooth and continuous, becoming rough and rimose-verruculose where they are well developed. The soralia are discrete, round to irregular in shape, convex to hemispherical, becoming confluent in some places. The soredia are greenish to yellowish white, rather coarse, (35-)40-60(-65) µm in diameter.

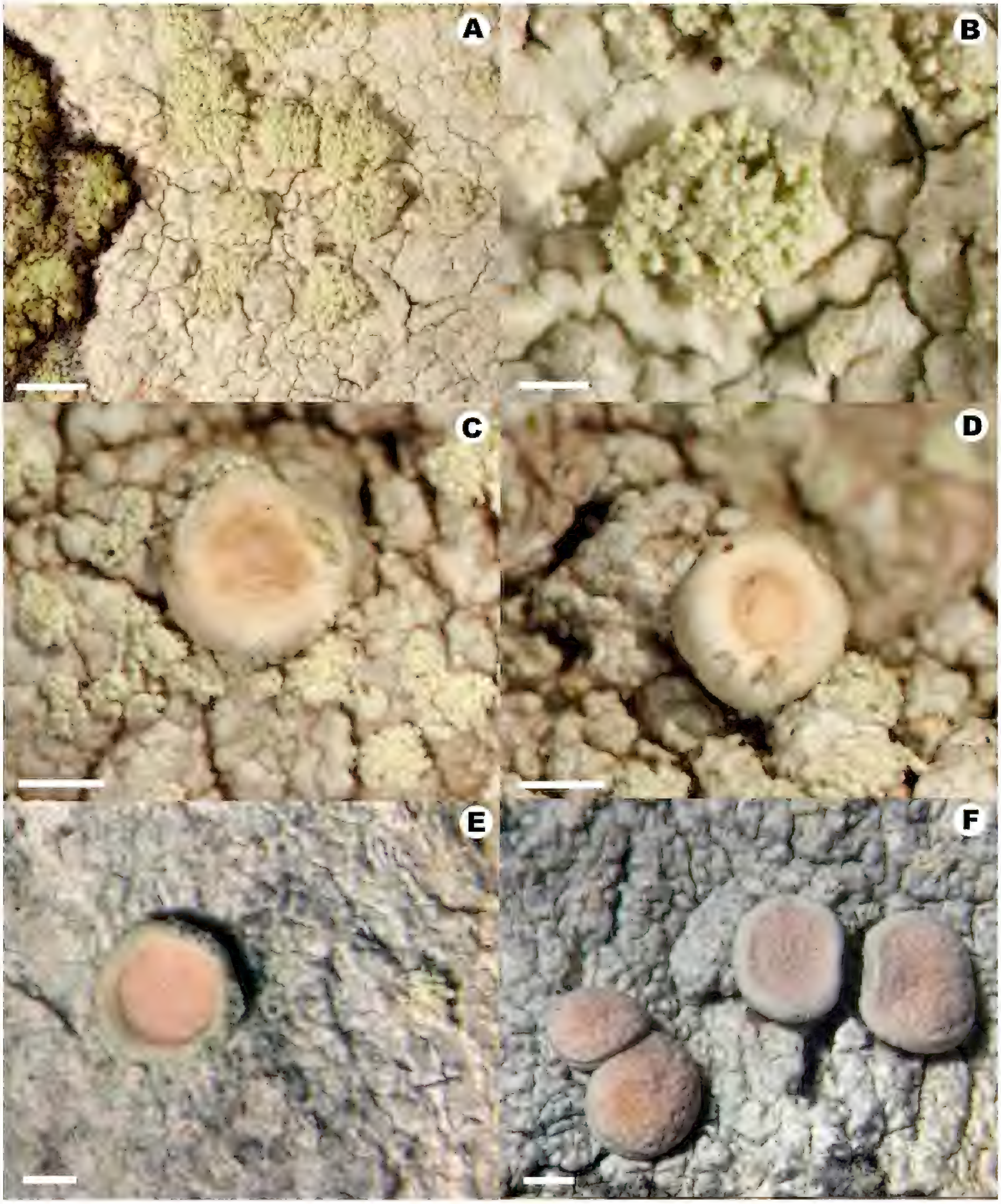

Figure 3, morphology of *Ochrolechia arborea* (A-B, *Lendemer 12065*; C-D, *Lendemer 16899*; E, *Brodo 30601*; F, *Brodo 31821D*). A, gross morphology of a typical sterile thallus (scale = 1.0 mm). B, detail of a soralium (scale = 0.25 mm). C-F, detail of the morphology of the apothecia (scales = 0.5 mm in C-D, 0.25 in E-F).

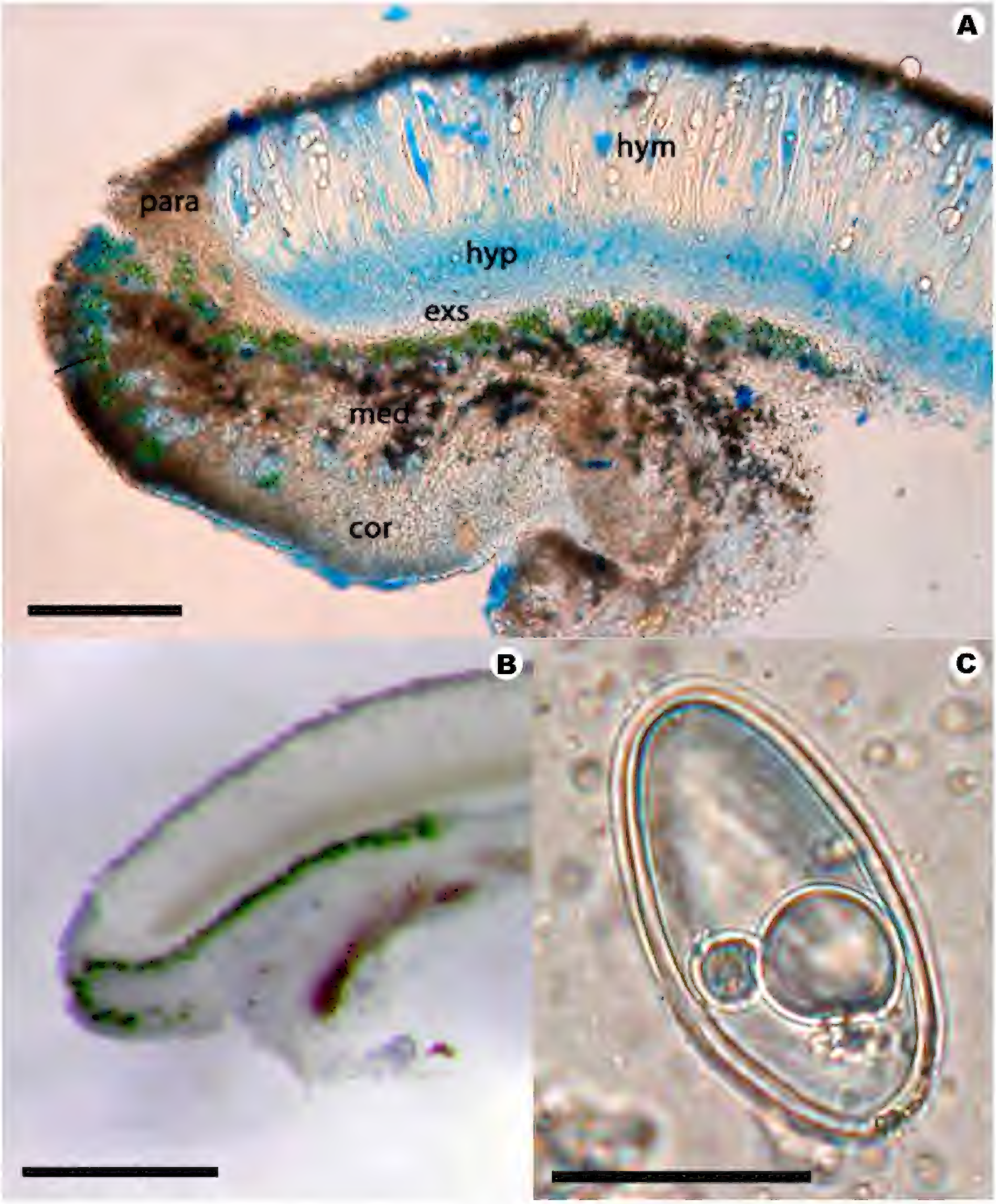

Figure 4, apothecial anatomy and ascospore of *Ochrolechia arborea* (all from *Brodo 31821*). A, microtome section of apothecium stained with cotton blue, cor=cortex, med=amphithecial medulla, exc=excipulum proprium, hym=hymenium, hypo=hypothecium, para=parathecium (scale = 200 µm). B, section of fresh apothecium showing distribution of algae below the hypothecium and exciple as well as in the margin (scale = 500 µm). C, mature ascospore (scale = 25 µm).

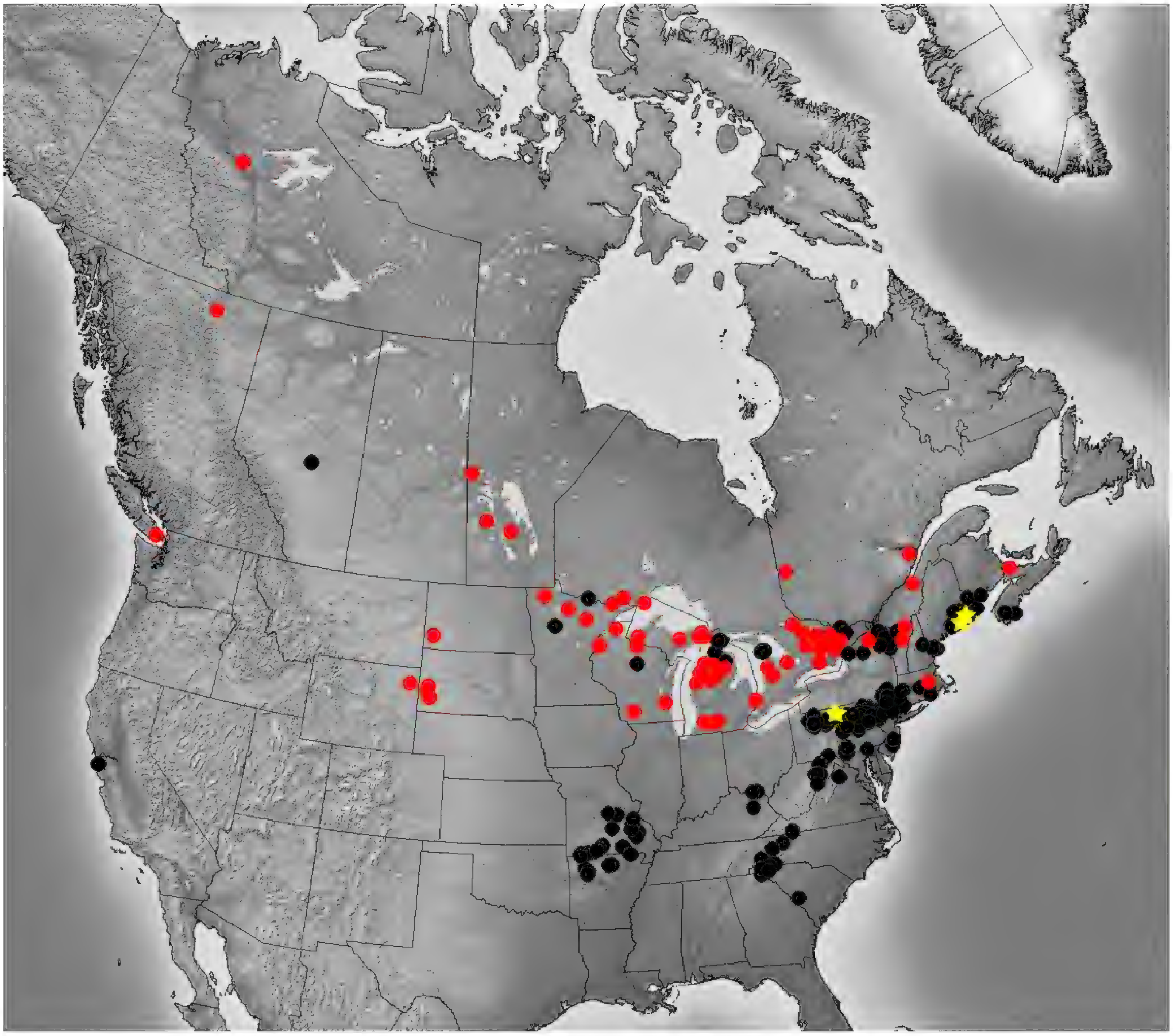

Figure 5, geographic distribution of *Ochrolechia arborea* in North America based on specimens examined for this study (black dots) supplemented by those examined for Brodo (1991; red dots). Fertile collections are denoted by yellow stars.

Apothecia 1.0-2.2 mm in diameter, 0.7-0.8 mm high, with pale orange-pink disks sometimes with a light pruina on young apothecia; thalline margins thick and smooth to slightly eroded and sorediate (Figs. 3C&E), barely higher than the disk when mature and becoming thinner and almost excluded in very old apothecia (Fig. 3F); inner excipular (parathecial) ring barely discernible. Algal layer thin, 37-50 µm, patchy to almost continuous below the hypothecium, continuous or becoming broken into radiating patches in the lateral margin (Fig. 4A&B). Cortex 25-35 µm thick laterally, expanding at the apothecial base to 50-60 µm, prosoplechtenchymatous (Fig. 4A), heavily inspersed with fine granules. Exciple unstained by cotton blue, ca. 25 µm below the hypothecium, expanding into a broad parathecium at the edge of the hymenium. Hymenium 170-190 µm high. Hypothecium pale yellowish, dark-staining, 75-90 µm thick. Epihymenium brownish with heavily granular inspersion. Paraphyses slender, 0.9-1.2 µm thick, branched and anastomosing. Ascospores 8 per ascus, at first thick-walled but thin-walled in maturity (Fig. 4C), 31-48 x 15-27 µm.

CHEMISTRY OF FERTILE THALLI. – Thallus cortex, C+ pink, UV+ yellow; soralia C+ pink, UV+ yellow; medulla C- or C+ pale pink where it is thick enough to test. Apothecial cortex, amphithecial medulla, and epihymenium C+ pink and UV+ yellow.

All thalli examined contained gyrophoric and lecanoric acids as well as lichexanthone. The apothecia contained these compounds as well as a trace of 4,5-di-*O*-methylhiascic acid. It should be noted that in some specimens the thallus cortex is only weakly UV+ yellow.

DISTRIBUTION AND ECOLOGY. – *Ochrolechia arborea* is widespread in boreal and temperate regions of North America with occasional populations occurring in the arctic and extending southward especially in the eastern mountain ranges and into the Black Hills (fig. 5). It is particularly common in the central and northern Appalachian Mountains of eastern North America. Throughout its range the species occurs on a wide variety of substrates, including hardwoods, conifers and wood. Several populations have also been found growing on non-calcareous rocks. The fertile material we have reviewed was found in coastal Maine at sites subject to frequent fogs, and in central Pennsylvania in a humid stream ravine with constant high humidity. These populations occurred in both forested and exposed situations.

NOTES. – In the rare instances where apothecia are produced on thalli of normally sorediate species, these structures often have abundantly sorediate margins, e.g., *Loxospora elatina* (Ach.) A. Massal., and the hymenium is often abnormally developed or sterile, e.g., *Calvitimela talayana* (Haugan & Timdal) Andreev and *Haematomma ochroleucum* (Neck.) J.R. Laundon (Brodo 2009; Brodo et al. 2008; Tønsberg 1992: 89). This was not, however, the case with *Ochrolechia arborea*, which had mainly smooth and even apothecial margins, only occasionally becoming sorediate. Furthermore, the apothecia had normally developed hymenia with apparently healthy asci and ascospores. The features of the apothecia and ascospores conform with those of *O. mexicana* in almost every way; only the hymenium seems to be somewhat lower (170-190 µm vs. 180-280 µm high). It is tempting to speculate that the two taxa may be sister species; this hypothesis, however, remains to be tested with molecular data.

Fertile specimens of Ochrolecia arborea examined. – **U.S.A. MAINE.** HANCOCK CO.: Sullivan, rest stop on US1, 12 mi E of Ellsworth, 17.vii.2006, on *Populus*, *I.M. Brodo et al. 31821* (CANL); trail to Catherine Mountain, 27.vii.2009, on *Acer*, *I.M. Brodo 32475* (CANL). WASHINGTON CO.: Steuben, Eagle Hill Field Research Institute, 26.viii.2001, on *Acer*, *I.M. Brodo 30601* (CANL). **PENNSYLVANIA.** TIOGA CO.: Tioga State Forest, W-facing slopes of S end of Callahan Hill, 14.v.2009, on *Pinus*, *J.C. Lendemer 16899* (NY).

Selected sterile specimens of Ochrolechia arborea examined. [Most of these records expand the range given in Brodo (1991) (see Fig. 5).] – **CANADA. ALBERTA:** Wagner Bog Natural Area, 5.ix.1985, on *Larix*, *J.E. Marsh 1257A* (NY). **NEW BRUNSWICK.** CHARLOTTE CO.: Pennfield Parish, W of Jake Lee Rd., 1.v.2011, on *Chamaedaphne*, *R.C. Harris 56722* (NY). **NOVA SCOTIA.** QUEENS CO.: Thomas H. Raddall Provincial Park, Moody Barrens, 7.v.1999, on *Gaylussacia, R.C. Harris 42901* (NY). SHELBURNE CO.: Tobeatic Wilderness Area, 8.v.1999, on *Pinus*, *W.R. Buck 35724* (NY). YARMOUTH CO.: along Hwy 203, Barclay Brook at Flintstone Rock, 8.v.1999, on branch, *W.R. Buck 35689* (NY). **ONTARIO.** BRUCE CO.: Bruce Alvar Nature Reserve, 26.ix.2010, on *Thuja*, *W.R. Buck 56614* (NY). OTTAWA-CARLETON CO.: City of Ottawa, Stony Swamp, 0.2-0.4 mi W of Richmond Rd., 19.v.2011, on *Acer*, *J.C. Lendemer 28105 & I.M. Brodo* (NY). PETERBOROUGH CO.: Petroglyphs Provincial Park, 7.vi.1984, on pine, *P.Y. Wong 3705, with R. Warren* (CANL). **QUEBEC.** PONTIAC MNP.: Gatineau Park, Church Hill, 22.v.2011, on *Quercus*, *J.C. Lendemer 28321 & C. Freebury* (NY). **U.S.A. ARKANSAS.** CARROLL CO.: along US 62 just NE of the White River, 2.xi.2000, on *Juniperus*, *R.C. Harris 44648* (NY). IZARD CO.: NE corner of Devil's Knob-Devil's Backbone Natural Area, 24.x.2001, on *Juniperus*, *R.C. Harris 45364* (NY). JOHNSON CO.: Ozark National Forest, Katie Knob, 17.iv.2004, on *Quercus*, *R.C. Harris 49292* (NY). MADISON CO.: Kings River Falls Natural Area, 0.5-1.5 mi E of trailhead on CR 3500, 5.x.2010, on *Acer*, *J.C. Lendemer et al. 25900* (NY). **CALIFORNIA.** SAN MATEO CO.: Gold Gate National Recreation Area, Sweeney Ridge, 28.i.2006, on *Pinus*, *J.C. Lendemer 5802 & K. Knudsen* (NY). **CONNECTICUT.** FAIRFIELD CO.: Highstead Arboretum, in town of Redding, 9.vi.2005, on *Betula*, *D. Ladd 27325* (NY). LITCHFIELD CO.: Town of Norfolk, Holleran Swamp Preserve, 20.ix.2003, on *Viburnum, R.C. Harris 48067* (NY). WINDHAM CO.: Town of Ashford, Yale Forest along Boston Hollow Rd., 24.vii.2002, on *Acer*, *R.C. Harris 46105-C* (NY). **GEORGIA.** RABUN/TOWNS CO.: Dick's Creek Gap, 11.vi.1981, on *Oyxdendron*, *R.C. Harris 13875B* (NY). **KENTUCKY.** BATH CO.: Daniel Boone National Forest, Tater Knob, 10.x.1995, on *Nyssa*, *R.C. Harris 36880* (NY). **MAINE.** HANCOCK CO.: Town of Aurora, N-facing slopes above Middle Branch of the Union River, 11.vi.2010, on *Thuja*, *J.C. Lendemer 23209* (NY). KNOX CO.: Town of Camden, Camden Hills State Park, 29.v.2009, on *Pinus*, *R.C. Harris 55555* (NY). WALDO CO.: Town of Lincolnville, Ducktrap River Preserve, 28.v.2009, on *Abies*, *R.C. Harris 55484* (NY) WASHINGTON CO.: Town of Steuben, Petit Manan National Wildlife Refuge, Harringdon Trail Loop, 9.vi.2010, on *Nemopanthus*, *J.C. Lendemer 22796* (NY). **MARYLAND.** GARRETT CO.: High Bog, 1.5 mi SSW of University of Maryland 4-H Camp, 24.ix.1989, on *Quercus*, *R.C. Harris 24563* (NY). **MICHIGAN.** CHEBOYGAN CO.: on Riggsville Rd. W of UMBS entrance, 2.vii.1974, on *Pinus*, *W.R. Buck s.n.* (NY). CHIPPEWA CO.: roadside pull-off S of Hwy M134 immediately

E of Albany Creek, 17.vii.2002, on twigs, *W.R. Buck 42178* (NY). MACKINAC CO.: Bush Bay, 7.vii.1981, on *Abies*, *R.E. Riefner 81-411* (NY). **MINNESOTA.** HUBBARD CO.: LaSalle Creek just outside NE corner of Itasca State Park, 4.viii.1974, on *Picea*, *C.M. Wetmore 23290* (NY). ST. LOUIS CO.: Voyageurs National Park, Lost Bay Trail to Agnes Lake, eastern Kabetogama Lake, 17.vi.1978, on *Betula*, *C.M. Wetmore 33536* (NY). **MISSOURI.** GASCONADE CO.: Canaan Conservation Area, 25.iii.2006, on *Juniperus*, *J.C. Lendemer et al. 6067* (NY). IRON CO.: St. Francis Mountains, Clark National Forest, along CR N just N of Reynolds Co. line, 13.x.1993, on *Juniperus*, *R.C. Harris 31130* (NY). OZARK CO.: Mark Twain National Forest, N of FSR 147 (Glade Top Trail), 20.v.2003, on *Cotinus*, *R.C. Harris 47488* (NY). STONE CO.: Ashe Juniper Natural Area, along California Lane, 5.xi.2002, on bark, *W.R. Buck 42898* (NY). WAYNE CO.: Sam A. Baker State Park, Mudlick Mountain, 15.x.2003, on *Carya*, *R.C. Harris 48402* (NY). **NEW HAMPSHIRE.** CARROLL CO.: Town of Madison, West Branch Pine Barrens Preserve, 19.ix.1999, on *Pinus*, *R.C. Harris 43228* (NY). **NEW JERSEY.** ATLANTIC CO.: Wharton State Forest, Batsto Natural Area, Pleasant Mills Cemetery, 9.x.2004, on *Juniperus*, *J.C. Lendemer 3151* (NY). BURLINGTON CO.: Mt. Misery, E of Mt. Misery Rd. 0.8 mi SE of NJ 70 at Mt. Misery Retreat Center, 20.ix.2004, on *Vaccinium*, *R.C. Harris 50088* (NY). SUSSEX CO.: Stokes State Forest, Sunrise Mountain (summit), 29.iii.2008, on *Quercus*, *J.C. Lendemer et al. 11585* (NY). **NEW YORK.** CLINTON CO.: Town of Peru, Valcour Island in Lake Champlain, 18.v.2007, on *Thuja*, *R.C. Harris 53542* (NY). CORTLAND CO.: Willet Landers Corners, 12.ix.1976, on *Pinus*, *R. Dirig L-2731A* (NY). DUTCHESS CO.: Dover Plains, Roger Perry Memorial Preserve, 27.v.2007, on *Juniperus*, *J.C. Lendemer 12006 & W.R. Buck* (NY). GENESEE CO.: Town of Bergen, Bergen Swamp Preserve, 20.v.2010, on *Thuja*, *J. Battaglia 2010-077* (NY). GREENE CO.: Catskill Park, Blackhead Range Trail, 13.v.1996, on *Populus*, *R.C. Harris 38564* (NY). ULSTER CO.: Catskill Park, trail to Belleayre Mt. from Lost Clove Trail Head Parking Area, 10.v.1996, on *Populus*, *R.C. Harris 38493* (NY). **NORTH CAROLINA.** JACKSON CO.: Cedar Cliff Mountain, ~3.5 mi E of Tuckasegee (NC 107) on NC 281, 11.viii.1994, on *Pinus*, *R.C. Harris 33020* (NY). MACON CO.: Wayah Bald ~8 mi W of Franklin, 26.ix.1989, on branch, *R.C. Harris 24677* (NY). TRANSYLVANIA CO.: Blue Ridge Parkway lookout 1 mi S of John Rock View, 31.v.1967, on *Vaccinium*, *R.C. Harris 3438-A* (NY). **OHIO.** ADAMS CO.: Appalachia Nature Preserve, S of Easter Run, 20.v.2006, on *Juniperus*, *J.C. Lendemer et al. 7509* (NY). SCIOTO CO.: Shawnee State Forest, Copperhead Lookout Tower, 21.v.2006, on *Quercus*, *J.C. Lendemer et al. 7238* (NY). **PENNSYLVANIA.** CAMERON CO.: Moshannon State Forest, Grant Trail just E of Cameron/Elk County line, 31.viii.2010, on *Kalmia*, *J.C. Lendemer 24025* (NY). CENTER CO.: Bald Eagle State Forest, above Winkleblech Vista, 14.ix.2010, on *Quercus*, *J.C. Lendemer 25462* (NY). CLARION CO.: Cook Forest State Park, Rhododendron/Indian Trail Loop, 6.ix.2010, on *Prunus*, *J.C. Lendemer 24555* (NY). ELK CO.: Elk State Forest, E slopes above Bell Draft, 1.ix.2010, on rock, *J.C. Lendemer 24137* (NY). LACKWANNA CO.: Merli-Sarnoski County Park, 17.vii.2008, on *Quercus*, *J.C. Lendemer 13196* (NY). MONROE CO.: Tobyhanna State Park, Kistler Ledge, 22.vii.2008, on *Acer*, *J.C. Lendemer 13776* (NY). UNION CO.: Bald Eagle State Forest, slopes above Brandon Rd. 0.25-0.45 mi S of jct w/ Jones Mountain Rd., 13.ix.2010, on rock, *J.C. Lendemer 25200* (NY). WYOMING CO.: State Game Lands #57, summit of Bartlett Mountain, 23.vii.2008, on *Acer*, *J.C. Lendemer 13855 & J. Kunsman* (NY). **RHODE ISLAND.** WASHINGTON CO.: border of towns of Exeter and South Kingstown, Marion Eppley Wildlife Sanctuary, 16.ix.2006, on shrub, *R.C. Harris 53146* (NY). **SOUTH CAROLINA.** AIKEN CO.: The Hitchcock Woods, just SW of city of Aiken, along Tea Cottage Path from entrance on Dibble Rd. to Barton’s Pond Bridge, 14.iii.2010, on *Kalmia*, *J.C. Lendemer 22116* (NY). **TENNESSEE.** CARTER CO.: Ripshin Bog on Tiger Creek Rd., 26.ix.1993, on *Aronia*, *R.C. Harris 30960* (NY). GREENE CO.: Horsehitch Gap, Cherokee National Forest, 17.ix.1991, on *Quercus*, *R.C. Harris 27231* (NY). **VERMONT.** ADDISON CO.: Snake Mountain Wildlife Management Area, Snake Mountain, 19.x.2010, on *Juniperus*, *J.C. Lendemer 27228 & M. Sundue* (NY). CHITTENDEN CO.: City of Burlington, Lone Rock Point above Champlain thrust fault, 17.x.2001, on *Thuja*, *J.C. Lendemer et al. 27055* (NY). LAMOILLE CO.: Town of Eden, Babcock Nature Preserve of Johnson State College, 14.v.2005, on *Abies*, *R.C. Harris 51387* (NY). **VIRGINIA.** GRAYSON CO.: Jefferson National Forest, 0.5 mi SW of VA 16 on VA 741/Homestead, 5.iv.2008, on *Betula*, *R.C. Harris 54055* (NY). WARREN CO.: Shenandoah National Park, North Marshall, 13.iii.2005, on bark, *J.C. Lendemer 4411* (NY). **WEST VIRGINIA.** PENDLETON CO.: Monongahela National Forest, Fanny Bennett Hemlock Grove, 20.iv.2001, on *Tsuga*, *R.C. Harris 44800* (NY). TUCKER CO.: Monongahela National Forest, Dolly Sods Wilderness, Bear Rocks, 21.iv.2001, on *Picea*, *R.C. Harris 44823* (NY). **WISCONSIN.** LINCOLN CO.: Town of Rock Falls, along E shore of Wisconsin River at Grandfather Dam, 27.iv.2002, on dead *Thuja*, *W.R. Buck 41628* (NY).

Specimens of Ochrolechia mexicana examined for this paper. – **MEXICO.** MEXICO: 7.5 mi. SE of Amecameca on Highway 196, 1.vii.1961, on fallen branches of *Pinus* and *Abies*, *F.B. Brodo 25C* (CANL). **U.S.A. NORTH CAROLINA.** HAYWOOD CO.: Buck Spring Gap, near mile post 407.7 on Blue Ridge Parkway, 8.vi.1986, on fallen oak branch, *I.M. Brodo 23810 & S. Gowan* (CANL). **NEW YORK.** ESSEX CO.: Mt. Marcy, between Adirondack Lodge and Marcy Dam, 9.x.1970, on branch of *Fagus*, *S. Nakanishi 19-5* (CANL).

II - KEY TO THE SOREDIATE SPECIES OF *OCHROLECHIA* ON BARK IN EASTERN NORTH AMERICA

This key includes both species that are typically sterile and sorediate as well those that are typically fertile and only rarely reproduce via the dispersal of lichenized diaspores. Several species not yet reported from the region, but those that could occur based on their distributions as understood by Brodo (1991) and Kukwa (2011) are also included. The names of these taxa appear in brackets and regular type face. The names of those taxa known to occur in eastern North America appear in bold type face.

1. Thallus first isidiate, the isidia breaking down into coarse granular soredia; cortex C- or weakly C+ pink, medulla C+ pink/red; UV-………………………………………………………..***O. antillarum* Brodo**
1. Thallus sorediate, not developing from isidia………………………………………..…………………... 2
    2. Thallus UV+ yellow (lichexanthone)…………… ……………………………………………..……. 3
        3. Thallus cortex C-, medulla C+ pink/red; soredia fine; apothecia very common; from subtropical/tropical regions of the Coastal Plain... ***O. africana* Vain. (rare sorediate populations)**
        3. Thallus cortex and medulla C+ pink/red; soredia coarse; apothecia common or rare; from temperate and boreal regions or the Mexican highlands north to Texas…………………………....4
            4. Hymenium 170-190 µm high; apothecia very rare; soralia abundant; common and widely distributed in temperate and boreal regions……………………... ***O. arborea* (Kreyer) Almb.**
            4. Hymenium 180-280 µm high; apothecia common; soralia not abundant; rare and known only from the Mexican highlands north to Texas……………………………………………...…. …………………………………………………..[*O. mexicana* Vain.; rare sorediate populations]
    2. Thallus UV-………………………………………………………………………………………..5
        5. Tropical/subtropical regions of the Coastal Plain……………………………………………..6
            6. Apothecia very rare; cortex of apothecial margin C+ pink/red if apothecia present; typically sorediate species; soredia very coarse, covering large patches, arising from the breakdown of isidia..………………………………………………………………..…..***O. antillarum* Brodo**
            6. Apothecia very common; cortex of apothecial margin C–; typically esorediate species; soredia very fine, arising from discrete soralia... ……………………………………...……….***O. africana* Vain. (rare sorediate populations)**
        5. Temperate/boreal/arctic regions……………………………………………...………………..7
            7. Soredia C-; apothecia rare; thallus contains variolaric acid ……………………………8
                8. Soralia at first discrete, later becoming irregular and confluent; thallus shiny and smooth; lacks fatty acids; on acid bark, especially conifers………………………... …………………………………………....................***O. turneri* (Sm.) Hasselrot**
                8. Soredia generally widespread on thallus, almost leprose; contains lichesterinic and sometimes protolichesterinic acids; generally on deciduous trees…………………. ……………………………………………………......***O. microstictoides* Räsänen**
            7. Soredia C+ pink to red (gyrophoric acid); apothecia rare or common…………….......9
                9. Thallus very thin, membranous, C-; contains variolaric acid…. ***O. gowardii* Brodo**
                9. Thallus thick, C+ red; lacks variolaric acid ……………………………..…….10
                    10. Fatty acids present……………………..***O. androgyna* (Hoffm.) Arnold**
                    10. Fatty acids absent…………………………....***O. mahluensis* Räsänen**

DISCUSSION

The hypochlorite reactions in the apothecial tissues, presence of lichexanthone and distribution of algae in the amphithecium indicate a close relationship between *Ochrolechia arborea* and *O. mexicana*, but also relate it to *O. africana* Vain. and *O. antillarum* Brodo. Because the C tests in apothecial sections were identical to those of *O. mexicana* (C+ pink in both the cortex and medulla), it was not surprising that the apothecia of *O. arborea* contained 4,5-di-*O*-methylhiascic acid (albeit in trace amounts). That substance is a major compound in *O. mexicana*, and it is noteworthy that it was lacking in the thallus of the specimens of *O. arborea* we studied. We tested several specimens of *O. mexicana* from CANL, chromatographing the apothecia and thallus separately, and they too produced almost all the 4,5-di-*O*-methylhiascic acid in the apothecia, with only traces being found in the thallus. In *O. africana*, where the cortex is C- and only the medulla is C+ pink, the situation was slightly more complex. Specimens having both 5-*O*-methylhiascic acid and 4,5-di-*O*-methylhiascic acid showed the presence of the former in both the apothecia and thallus, but the latter only in the apothecia. Specimens of *O. africana* containing only 5-*O*-methylhiascic acid had an identical chemical profile in both the apothecia and thallus. In all of the species containing lichexanthone, that compound was found in all tissues of all the species: thallus cortex (and perhaps the medulla), soralia (when present), amphithecial cortex and epihymenium (making the apothecial disk UV+ yellow).

Brodo (1991: 736) speculated that the hiascic acids in *Ochrolechia* are largely or entirely confined to the apothecia, perhaps confined to the amphithecial medulla where a positive C test is obtained. Here we show that this is only partly true. Although 4,5-di-*O*-methylhiascic acid seems to be largely or entirely confined to the apothecial tissues, 5-*O*-methylhiascic acid is not. These compounds, however, may well be responsible for the positive C test in the amphithecial medulla of all these species.

Based on the chemistry and C reactions of the apothecia of *Ochrolechia arborea,* it seems clear that the species is most closely related to *O. mexicana*. In fact, it calls into question exactly how one is to distinguish the occasional sorediate specimen of the latter from *O. arborea*. So far, sorediate specimens of *O. mexicana* that we have examined typically have a thicker, verruculose thallus, and abundant, saucer-shaped apothecia with only sparse soralia. These sorediate populations were all found in a single geographic area (Mexico to Texas) that is allopatric with the known geographic distribution of *O. arborea* (Brodo 1991). Typical esorediate populations of *O. mexicana*, however, are found in the Appalachian-Great Lakes region, where *O. arborea* is common. Thus the species are at least partially sympatric and there is a potential that sorediate populations of *O. mexicana* could occur in the same geographic regions as *O. arborea*. Based on the fertile specimens of *O. arborea* we examined, the thinner thallus, abundance of soralia, smaller soredia and sparse apothecia with less prominent margins in maturity should be sufficient to separate *O. arborea* from the sorediate populations of *O. mexicana*.

CONCLUSION

The role that characters relating to reproductive modes should play in taxon delineation and classification has been a hotly debated topic in lichenology in the past (Poelt 1970, Mattsson & Lumbsch 1989, Tehler 1982, Tønsberg 1992: 88-94). Historically, authors typically considered asexually reproducing lichens to represent variants or morphs of otherwise sexual species. It was not until the middle of the last century that a different perspective gained ground, in which such entities were hypothesized to represent independent taxa and thus formally described at the species level. Although there was some dissent from this perspective, the use of reproduction via lichenized diaspores as a character in circumscribing species has now become widely accepted and commonplace. Recent molecular studies however, have shown lichen reproductive biology to be considerably more complex than was previously thought (Kroken & Taylor 2001, Lohtander et al. 1998, Lücking et al. 2008, Myllys et al. 2001, Spribille et al. 2011, Tehler et al. 2009, Wirtz et al. 2012).

Previously, taxonomic schemes have attempted to unilaterally recognize lichens that reproduce by the dispersal of lichenized diaspores as either unimportant aberrant morphotypes or as distinct and presumably monophyletic taxa. The studies cited above, however, have drawn conflicting conclusions regarding the validity of either of these two approaches. It is true that, in many instances, molecular phylogenetic analyses of sequence data have failed to recover taxa defined by reproductive modes as monophyletic. However, this result has been far from universal and monophyletic asexually reproducing species of both macro- and micro- lichens have also been routinely reported in the literature. The complex nature of this situation is best highlighted by Tehler et al. (2009) who found different taxa within a single species aggregate to be reproductively variable (i.e., with both sterile sorediate *and* fertile esorediate populations) or reproductively uniform (i.e., with either sterile sorediate *or* fertile esorediate populations). Thus it would appear that thanks to the technological advances of the last two decades, we must once again re-evaluate the role of reproductive modes in taxon delineation of lichens. While taxonomies have historically used, or not used, reproductive modes to circumscribe species *a priori*, the accumulation of new data strongly indicates the need to evaluate each case individually with an independent dataset.

The genus *Ochrolechia* represents fertile ground for such studies and could serve as an excellent system to better understand the pressures driving the evolution of asexual reproduction in lichenized fungi.

As we have highlighted in the present contribution, reproductive modes appear to be unusually labile within *Ochrolechia*, at least compared to other groups of lichens. While the occasional production of soredia in normally non-sorediate lichens has been reported elsewhere (e.g., Brodo and Hawksworth 1977, Brodo et al. 2008, Hafellner & Obermayer 2005), we are unaware of any other genus where a large number of species appear able to reproduce in multiple ways. Indeed, this apparent variability in reproductive modes has contributed to considerable instability in taxonomic schemes of *Ochrolechia* at the species level (Kukwa 2011).

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Reports of *Leptogium hibernicum* from the southern Appalachian Mountains, a major range extension for the species in North America

FRANCES ANDERSON[1]

ABSTRACT. – *Leptogium hibernicum* was first recorded in North America in 2009 from near Hectanooga in southwestern Nova Scotia, Canada, and the identification was confirmed by P.M.Jørgensen. A 2011 collection from Great Smoky Mountain National Park appeared to be a second occurrence. Subsequently, specimens identified as *Leptogium laceroides* from the southern Appalachian Mountains were reviewed and compared to the Nova Scotia material of *L. hibernicum.* The comparison of external morphology and thallus sections in water revealed two earlier collections of *L. hibernicum* from the southern Appalachians, thereby extending its known range on the continent.

INTRODUCTION

The discovery of *Leptogium hibernicum* Mitch ex P.M. Jørg. in southwestern Nova Scotia in 2009 was the first known occurrence of this oceanic species on the North American continent (Neily & Anderson 2010). Known from Western Europe, South America, New Guinea, the West Indies and South Africa (Jørgensen 1997), it is one of the rare oceanic cyanolichens with an amphi-atlantic distribution (Maass 1983, Neily & Anderson 2010). In Nova Scotia, it was found on white cedar (*Thuja occidentalis*) in the only wet cedar forest found in the province (Neily 2011), approximately 25 km from the Bay of Fundy, at an elevation of approximately 25 meters.

In the summer of 2011, lichenologists at the New York Botanical Garden contacted me regarding the discovery of a potential population of *Leptogium hibernicum* on birch (*Betula)* in a high elevation spruce (*Picea)* – fir *(Abies)* forest (1768-2012 m) in the North Carolina portion of Great Smoky Mountains National Park. This suggested the range of *L. hibernicum* might be more extensive than originally supposed. Preliminary examination seemed to confirm the Appalachian specimen was *L. hibernicum*, but some morphological characters varied slightly, seeming closer to *L. laceroides* (de Lesd.) P.M. Jørg. *Leptogium laceroides* is somewhat common in much of Nova Scotia, but its external features vary, possibly influenced by habitat. Ten specimens from NY, including the 2011 collection, were compared to each other and to material of both species from Nova Scotia. The results of this comparison and photographs of thallus sections appear below. Three of the NY specimens (including the 2011 collection) were confirmed as *L. hibernicum*.

During the course of writing this paper, another Nova Scotia location of *Leptogium hibernicum* has been added to the distribution map (*Anderson 151088*, NSPM). This collection was made in a habitat type more common in Nova Scotia than the cedar swamp, a mixed swamp dominated by red maple (*Acer rubrum*) with an open understory comprised of sphagnum and cinnamon fern (*Osmunda cinnamomea*), in Shelburne County, approximately 10 kilometers from the Atlantic coast, at an elevation of approximately 70 meters.

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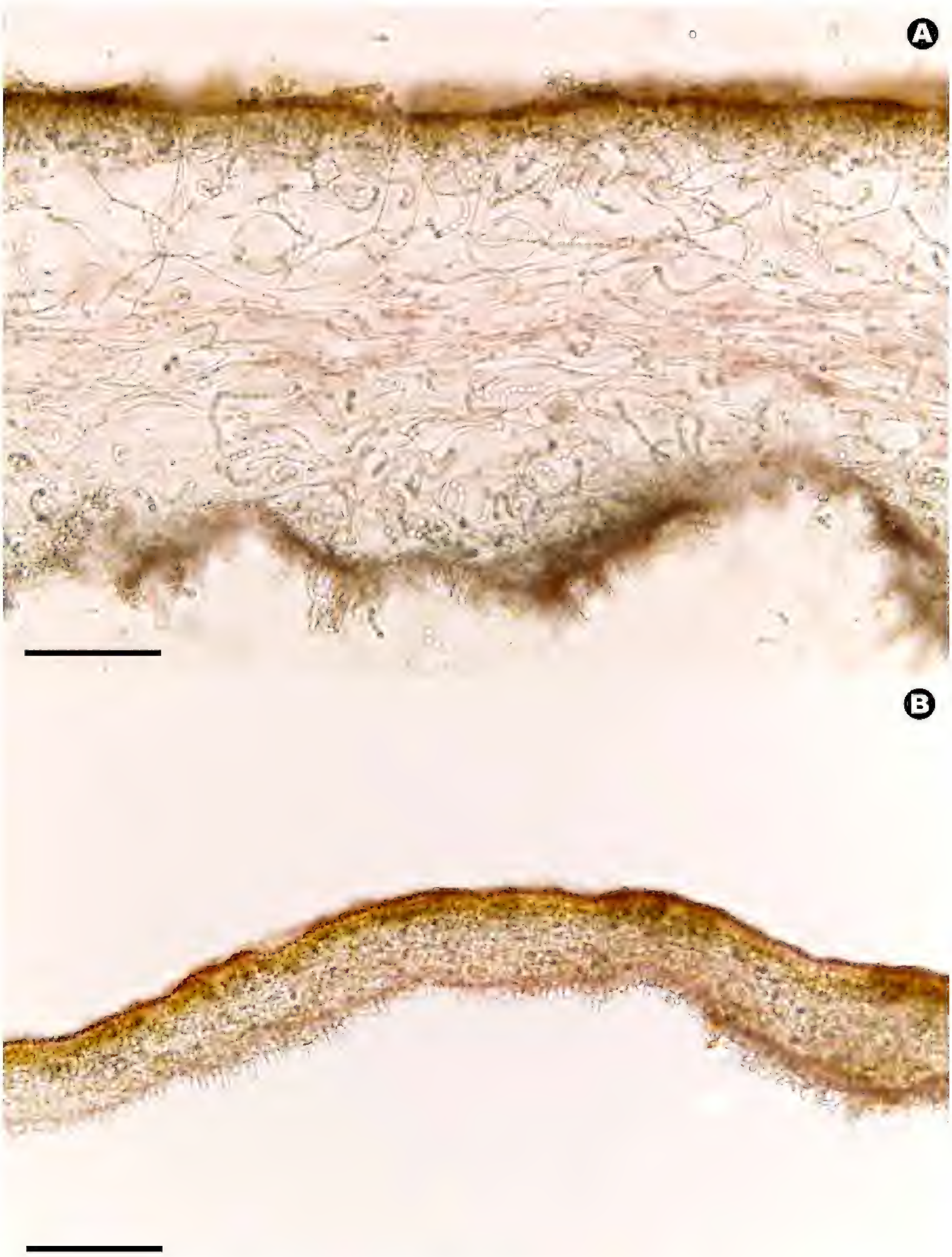

Figure 1, comparision of thallus sections of *Leptogium hibernicum* (A, *Dey 30477*) and *L. laceroides* (B, *Dey 31657*) mounted in water. Both scales = 100 µm.

MATERIALS AND METHODS

All specimens were examined under a light microscope. Small portions of two or more lobes were sectioned and mounted in water. Sections were examined at 3X, 10X and 40X with a Leitz-Wetzlar compound microscope. Light micrographs were captured using the program CellSens Standard and an Olympus DP72 digitial camera mounted on an Olympus Bx53 compound light microscope.

RESULTS AND DISCUSSION

Leptogium hibernicum shares morphological similarities with *L. laceroides* (Aragon et al 2005) which is also found in the Appalachian Mountains of eastern North America (Hinds & Hinds 2007), extending into Atlantic coastal Nova Scotia. The type of *L. americanum* Degel., a synonym of *L. laceroides*, was collected in the Appalachian region. Both *L. hibernicum* and *L. laceroides* have grey-brown, moderately sized and somewhat undulating lobes with entire to dissected margins, laminal and marginal isidia, a sometimes rugulose upper surface and a dense, short tomentum on the lower surface composed of globose cells.

The isidia of *Leptogium laceroides* range from granular to cylindrical or lobulate (Hinds & Hinds 2007), while the isidia of *L. hibernicum* range from globular to subcylindrical (Aragon et al. 2005), and can become somewhat inflated when larger with collapsed, usually wrinkled apices. The isidia of both species occasionally develop into lobules. In *Leptogium hibernicum* they are somewhat inflated when young rather than flat as in *L. laceroides.* The 2011 collection from the Great Smoky Mountains has few laminal isidia, the diaspores where the wrinkled apices are most obvious. The difficulty in assessing this critical character led to the examination of more collections from the southern Appalachians. The upper surface of *L. laceroides* is shiny to rugulose with scattered tomentose patches. *L hibernicum* can also display tomentose patches on the upper surface (Jørgensen 2007), but it has distinctive transversely wrinkled sometimes coarse, parallel striations (Gilbert & Jørgensen 2009) which are also apparent on the lower surface (Jørgensen 1973). These striations are not as pronounced in the 2011 collection.

The thallus anatomy of *Leptogium hibernicum* and *L. laceroides* provides a clear distinction between the two species and is apparent in the sections mounted in water that are reproduced above (figure 1). *Leptogium hibernicum* swells considerably when wet (Aragon et al. 2005, Jørgensen 2007, Gilbert & Jørgensen 2009), expanding to a thickness of more than 400µm in water (Aragon et al. 2005). In contrast, the thallus thickness of *L laceroides* does not swell distinctly when wet and remains below 160 µm in thickness. The internal structure also differs; from long *Nostoc* chains floating among loosely woven hyphae in *L. hibernicum* to ± densely woven hyphae with smaller clusters of *Nostoc* cells that occur more abundantly just below the cortex in *L. laceroides* (Sierk 1964). The size differences of the cortical cells of the two species described by Aragon et al. (2005) were less observable in the North American material.

Two of the ten specimens examined from NY that were originally identified as *Leptogium laceroides* exhibited the *L. hibernicum* structure, as did the collection from 2011. Thallus widths of the three ranged from 226-400 µm at 40X. The thalli of the remaining six specimens were clearly of the *L. laceroides* type, with the thallus expanding to a maximum of 140µm.

The locations where *L. hibernicum* has been found in Nova Scotia confirm the oceanic distribution in Europe described by Jørgensen (2007) and mirror that of other rare cyanolichens such as *Degelia plumbea* and *Pannaria lurida* in the northern coastal parts of the Great Lakes-Appalachian biogeographical zone (Brodo et al 2001, Hinds & Hinds 2007). Its presence also in the southern Appalachian Mountains at middle to high elevation suggests that the North American finds may be the northern outposts of basically subtropical species such as *Coccocarpia palmicola* (Spreng.) Arv. & D.J. Galloway and *Erioderma mollissimum* (Samp.) Du Rietz, etc., as *L. hibernicum* is quite common in the northern Andes (P.M. Jørgensen, pers.comm.) The recent find in Shelburne County, Nova Scotia supports the speculation that it may be an overlooked or misidentified species.

Specimens of Leptogium hibernicum examined. - **CANADA. NOVA SCOTIA**. DIGBY CO.: Hectanooga cedar swamp, 44° 08N, 66°04W, 2009, on *Acer rubrum*, *F. Anderson 150464* (NSPM), UTM(NAD83) 19T 0735719 4884467, on *A. rubrum*, 2010, *F. Anderson 150500* (HB. ANDERSON). SHELBURNE CO.: near Jordan Falls, UTM(NAD83) 20T 0315125 4860586, 2012, on *A. rubrum, F. Anderson 151088* (NSPM). **U.S.A. NORTH CAROLINA.** JACKSON CO.: Cedar Cliff Mountain, ca. 3.5

mi E of NC 107 at Tuckasgee along NC 281, 35°15'N 83°05'W, 710-1010m, 1998, on *Quercus*, *R.C. Harris 42791* (NY). SWAIN CO.: Great Smoky Mountains National Park, Appalachian Trail between Clingmans Dome and jct w/Goshen Prong Trail, 35°33'45"N 83°29'58"W, 5800-6600 ft., 2011, on *Betula*, *J.C. Lendemer 29656* (NY). **TENNESSEE.** BLOUNT CO.: Great Smoky Mountains National Park, Cold Spring Gap in Cades Cove Mtn, Great Smoky Mountains National Park, 35°37'32"N 83°49'24"W, 1998, on dead tree, *J.P. Dey 30477* (NY).

Specimens of Leptogium laceroides examined. – **CANADA. NOVA SCOTIA.** LUNENBURG CO.: Blandford Game Sanctuary, UTM (NAD83) 20T 0413337 4932531, lake edge in mature conifer stand, 2005, on *Acer rubrum*, *F. Anderson 334* (HB. ANDERSON). QUEENS CO.: south of Port Mouton off Highway 103, UTM(NAD83) 20T 0350911 4864421, in mixed woods along brook, 2006, on *A. rubrum*, *F. Anderson 472* (HB. ANDERSON). SHELBURNE CO.: near Jones Harbour, UTM (NAD83) 20T 034501 4848151, mixed conifer *Acer rubrum* swamp, 2009, on *A. rubrum*, *F. Anderson 14980* (HB.ANDERSON). **U.S.A. GEORGIA.** WHITE CO.: Crowrock Mountain, Appalachian Trail, approach trail, 2007, on *Fraxinus*, *S.Q. Beeching 3094* (NY). **NORTH CAROLINA.** JACKSON CO.: Nantahala National Forest, S slope of Piney Ridge Knob, 35°21'N 83°06'W, 1998, corticolous, *W.R. Buck 34957*(NY). MACON CO.: Sunset Park Rd., Highlands, UTM 17 300694E 3880581N, 2002, corticolous, *J.C. Lendemer 1456* (NY). SWAIN CO.: Balsam Mountain Campground, Great Smoky Mountains National Park, 35°33'54"N 83°0'26"W, 2004, on deciduous tree, *J.P. Dey 31705* (NY); Great Smoky Mountains National Park, Indian Gap (ATBI Plot A06), 2000, on *Fagus*, *J.P. Dey 29876* (NY); Great Smoky Mountains National Park, Polls Gap 35°33'47"N 83°09'42"W, 2004, on *Betula, J.P. Dey 31657* (NY). TRANSYVANIA CO.: Gorges State Park east-facing slope below Grassy Ridge, UTM 17 322445E 3884462N, 2005, on *A. saccharum*, *J.C. Lendemer 4805* (NY).

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Molecular data confirm the identity of populations of the water fan lichen from eastern Canada as *Peltigera hydrothyria* s. str.

JAMES C. LENDEMER[1] AND FRANCES ANDERSON[2]

ABSTRACT. – Sequences of the nuclear internal transcribed spacer region (nrITS) were generated from two populations of *Peltigera hydrothyria* from eastern Canada (one from Quebec and one from Nova Scotia). Both sequences were identical to reference sequences of that taxon in GenBank and confirm the identity of these populations as *P. hydrothyria* s. str.

INTRODUCTION

Recently Lendemer and O'Brien (2011) revised the taxonomy of *Peltigera hydrothyria* s.l., commonly known as the water fan lichen (Brodo et al. 2001). Using a combination of molecular phylogenetic analyses of ITS sequence data, biogeographical and chemical data those authors recognized two allopatric species within what had been circumscribed as a single species by previous authors. The recognition of two species, one restricted to mountainous western North America and the other restricted to the Appalachian Mountains and their outliers in eastern North America presented potentially significant implications for the conservation of this aquatic macrolichen.

The sampling of the eastern North American populations of *Peltigera hydrothyria* for the molecular component of the study by Lendemer and O'Brien (2011) included only representatives from the central and southern Appalachian Mountains. It did not include representatives of the populations that had previously been discovered in three provinces in eastern Canada (New Brunswick, Nova Scotia and Quebec). In conjunction with the preparation of reports on the conservation status of *P. hydrothyria* in Canada, and the recently described *P. gowardii* Lendemer & H. O'Brien, sequences were generated for populations of *P. hydrothyria* from two eastern Canadian provinces in an effort to confirm their identity as *P. hydrothyria* s. str. The results of this effort are reported here.

MATERIALS AND METHODS

Two specimens of putative *Peltigera hydrothyria* were collected in Nova Scotia and Quebec (one each) and sent to the New York Botanical Garden (NY) for further study. DNA extraction and PCR amplification of the nuclear ribosomal internal transcriber region (nrITS) were performed at that institution following the methods of Lendemer (2011). Sequences were also obtained, examined, and assembled following Lendemer (2011). Comparison of the newly generated sequences to reference sequences of *P. hydrothyria* and *P. gowardii* was conducted using blastn searches of the NCBI nucleotide collection (Altschul et al. 1997).

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RESULTS

Sequences of the nuITS region were obtained from two vouchers of *Peltigera hydrothyria* collected from two widely separated localities in eastern Canada. The province of Quebec hosts the northernmost known population of *P. hydrothyria* and the most western one in Canada. The Nova Scotian voucher was from one of the six more easterly sites. Both of the sequences were 100% identical to the representative sequences corresponding to *P. hydrothyria* s. str. deposited in GenBank from the study by Lendemer and O'Brien (2011). These results confirm the identity of the populations from eastern Canada as *P. hydrothyria* s. str. and affirm the observations of Lendemer and O'Brien (2011) that populations from throughout the range of *P. hydrothyria* s. str. exhibit no divergence in their nrITS sequences.

GenBank accession numbers and associated voucher data for this study. –**CANADA. NOVA SCOTIA.**CUMBERLAND CO.: Cape Chignecto Provincial Park, Eatonville Brook, perennial stream under mixed canopy of *Betula* and *Abies balsamea*, 15.vii.2011, on bedrock in stream, elev. 68 m., *F. Anderson 151092* (NY-1231520; NY Isolate #1228, GenBank #JX648552). **QUEBEC:** Rivière Noire, Forêt Montmorency, pool in eddy of fast flowing river, close to east bank, 23.viii.2011, on underwater rock, elev. 723 m., *F. Anderson 151050* (NY-1231529; NY Isolate #1277, GenBank #JX648553).

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Puttea (Pilocarpaceae) in eastern North America

WILLIAM R. BUCK[1] AND JAMES C. LENDEMER[2]

ABSTRACT. – *Puttea margaritella* is reported new to eastern North America from a single collection from the Gaspé Peninsula of Québec, Canada and *P. exsequens* is reported as new to North America from a single collection from New Brunswick, Canada.

INTRODUCTION

Puttea S. Stenroos & Huhtinen was described a few years ago (Stenroos et al. 2009) to accommodate a single species of hepaticolous lichen, *Lecidea margaritella* Hulting. The marginally lichenized fungus was reported to be restricted to growing on the hepatic *Ptilidium pulcherrimum* (Weber) Hampe. However, when the species was reported from western North America (Spribille et al. 2010) it was reported to also grow on *Ptilidium californicum* (Austin) Underw. Stenroos et al. (2009) speculated that *Puttea* is either a necrotrophic parasite or colonizes already dead, decaying shoots of the hepatic. Indeed, the material found by us in eastern Canada is growing over the dead and decaying portions of the *Ptilidium pulcherrimum*, not on the living, reddish plants. The apothecia are white and one might be misled in thinking they are conspicuous, but the largest ones are only 0.4 mm in diameter and therefore the species is essentially invisible without magnification. The scanty thallus is not visible in the field (and scarcely so under the dissecting microscope). Until recently it was known only from boreal areas of Europe, specifically Fennoscandia (including adjacent Karelia) and woodland areas of central Europe. Spribille et al. (2010) reported finding the lichen in Alaska, Montana and British Columbia.

A second species was recently transferred into *Puttea* (Davydov & Printzen 2012) because of anatomical similarities to the type species. *Puttea exsequens* (Nyl.) Printzen & Davydov grows on decorticated wood and had previously been accommodated in a broadly circumscribed *Lecidea* Ach. A generous reviewer (Zdeněk Palice) called to our attention that material (mis)identified as *Lecidea symmictella* Nyl. may well be *P. exsequens*. Here we report on the occurrence of both species of *Puttea* in eastern North America; recognizing *P. margaritella* (Hulting) S. Stenroos & Huhtinen for the first time from this half of the continent and *P. exsequens* for the first time from North America.

MATERIALS AND METHODS

This study is based on material collected by the authors and deposited in the herbarium of The New York Botanical Garden (NY). Morphological (dissecting and compound light microscopy) were carried out using the methods outlined by Lendemer et al. (2008).

RESULTS AND DISCUSSION

The first author was editor of *The Bryologist* when *Puttea* was published in that journal and, ever since reading the manuscript, it became a goal of his to find *Puttea margaritella* in eastern North America.

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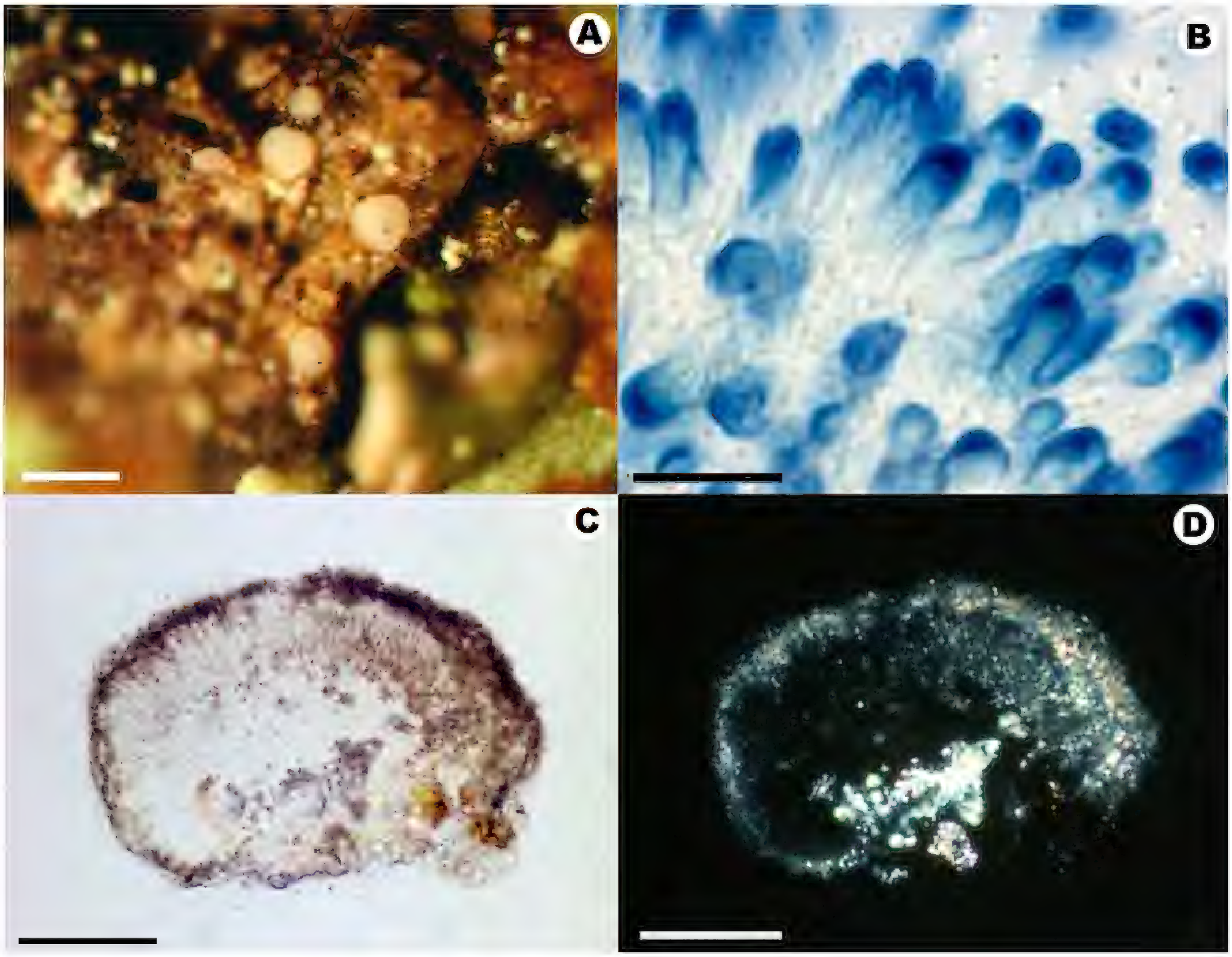

Figure 1. *Puttea margaritella* (from *Buck 59713*, NY). A. Habit (dry). B. Asci with KI. C. Cross-section of apothecium. D. Cross-section of apothecium in polarized light, showing crystals. Scale bars = 0.25 mm: A; 100 µm: C and D; 20 µm: B.

Initially he scanned the herbarium material of *Ptilidium pulcherrimum* in NY, but without success. Most recently, the 21st Tuckerman Lichen Workshop was held in Parc national de la Gaspésie in the Gaspé Peninsula of Québec, Canada. This area is well known as an interesting biogeographic area and is the northern limit of the North American Deciduous Forest Biome with a large representation of boreal bryophyte species (Belland & Favreau 1988, Favreau 1987). Therefore, he was especially diligent in looking for this lichen during the fieldwork associated with the workshop. His search was encouraged by the fact that *Ptilidium pulcherrimum* is one of the most common hepatics in the park, and is often dominant on rotting logs and stumps. Nevertheless, after a few days of repeated looking with a hand-lens at multiple populations of *Ptilidium*, he remained unsuccessful.

Our last day in the field was scheduled to be in the vicinity of Lac-aux-Américains, a locality previously botanized by M. L. Fernald along with J. F. Collins, who collected lichens (Riddle 1909). The lake margin itself did not prove to be very interesting or accessible and so Buck took a trail from the lake up to Mont Xalibu, through a moist forest dominated by *Abies balsamea* (L.) Mill. At the highest point that he reached on the trail, ca. 730 m, he decided to look at one last population of *Ptilidium*, growing on a decaying *Abies* stump, before turning back. Much to his delight, once he looked at the hepatic with a hand-lens he could see very small white apothecia. He had been looking for hepaticolous fungi during the workshop and had found several, but was optimistic that this might finally be the *Puttea*. Back in the make-shift microscope laboratory we had set up in the park Le Centre de Découverte, we were able to look at the specimen with more magnification. Although we did not have the relevant literature available to us there, it was generally agreed that the specimen was indeed *Puttea margaritella*. Back home, at The New York Botanical Garden, Dr. Richard Harris verified the identification microscopically. In the protologue of *Puttea* (Stenroos et al. 2009), the ascospores were reported to be 5.3–*6.3*–7.3 × 2.3–*2.5*–3.0 µm. The

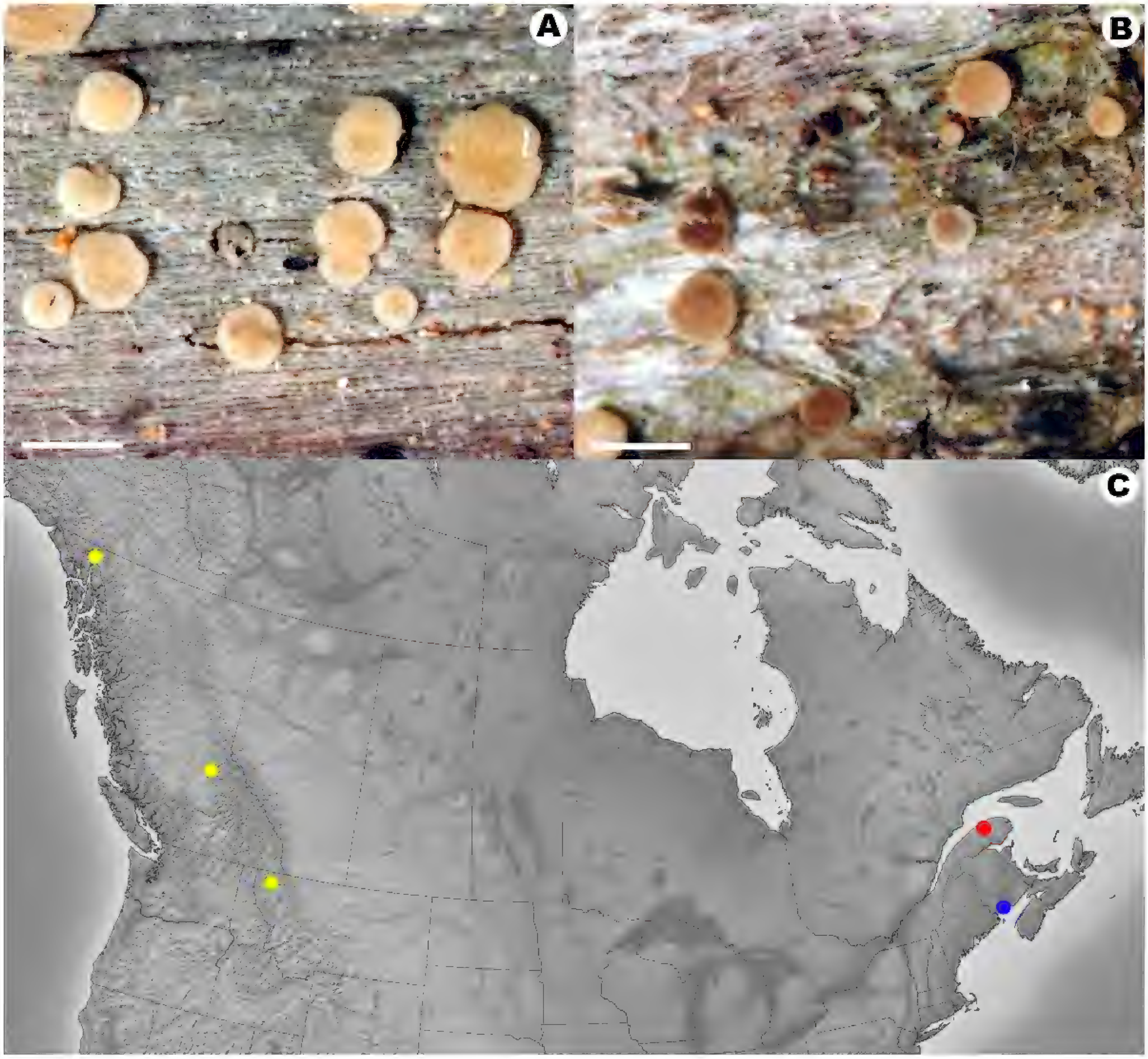

Figure 2. *Puttea exsequens* (A-B) and geographic distribution of the species of *Puttea* in North America as presently known (C). A. Habit of European population of *P. exsequens* (*Malme s.n. = Lich. Suec. Exs. 44*, NY). B. Habit of North American population of *P. exsequens* (*Buck 57774*). C, geographic distributions of *P. exsequens* (blue dot) and *P. margaritella* (yellow dots = previous reports, red dot = new report here). Scale bars = 0.5 mm.

Québec material has slightly shorter spores (4.8–6.2 × 2.1–2.8 µm) but otherwise is a very good match for European material (the Québec material is illustrated here in Figure 1). Therefore, the distribution of *P. margaritella* in North America is greatly extended from that previous reported by Spribille et al. (2010) (see Figure 2C herein).

After having written a first draft of this manuscript, it was suggested that the second species of *Puttea*, *P. exsequens*, be discussed. As mentioned above, it was suggested that material identified as *Lecidea symmictella* Nyl. might actually represent the second species of *Puttea*. Although externally similar to *P. exsequens* in appearance, *L. symmictella* can be distinguished by its narrower ascospores (1.5–3.0 µm vs. 3.0–4.5 µm wide in *P. exsequens*; *fide* Davydov & Printzen (2012)).

Lecidea symmictella was only recently reported from North America (Bennett 2006) from a single collection from Wisconsin. Unfortunately the material was not discussed in detail and we cannot be certain it represents *L. symmictella*. The taxon was also reported by Spribille and Björk (2010) from two collections, one from Montana and the other from the Thunder Bay District of Ontario, Canada. Although we have not seen these collections we suspect they actually represent true *L. symmictella* based on the discussion presented in that publication. In 2011, at the 20th Tuckerman Lichen Workshop, held in New Brunswick, Canada, the first author collected a specimen which was identified as *L. symmictella*. However, upon reexamination of the material by us, it proved to be *P. exsequens* (see Figures 2A–B for a comparison of European and North American material of *P. exsequens*). *Puttea exsequens* was previously known from Europe (e.g., Austria, Norway, Romania, and Sweden) and Asiatic Russia (Altai Republic) (Davydov & Printzen 2012). Here the range of the species is extended to include North America as well (Figure 2C).

Specimen of Puttea exsequens examined. – **CANADA. NEW BRUNSWICK.** CHARLOTTE CO.: Saint Patrick Parish, Caughey-Taylor Nature Preserve, E of NB 127, N and E of Sam Orr Pond, 45°09'56"N, 67°02'49"W, rhyolite and basaltic bluffs in mixed conifer (*Picea*, *Abies*, *Thuja*) and *Betula* forest, 2.v.2011, growing on decorticated wood, *W.R. Buck 57774* (NY-01221841).

Specimen of Puttea margaritella examined. – **CANADA. QUÉBEC.** M.R.C. DE LA HAUTE-GASPÉSIE: Parc national de la Gaspésie, along Sentier de la Grande Traversée Est toward Mont Xalibu from Lac-aux-Américains (48°57'26"N, 66°01'36"W, 685 m) to *Abies balsamea* forest at ca. 730 m (48°57'35"N, 66°01'38"W), moist fir forest with granitic outcrops, 5.vii.2012, on *Ptilidium* on rotting *Abies* stump, *W.R. Buck 59713* (NY-1596214).

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The Annotated Checklist of Lichens, Lichenicolous and Allied Fungi of Channel Islands National Park

KERRY KNUDSEN[1] AND JANA KOCOURKOVÁ[2]

ABSTRACT. – For Channel Islands National Park, at the beginning of the 21st century, a preliminary baseline of diversity of 504 taxa in 152 genera and 56 families is established, comprising 448 lichens, 48 lichenicolous fungi, and 8 allied fungi. *Verrucaria othmarii* K. Knudsen & L. Arcadia nom. nov. is proposed for the illegitimate name *V. rupicola* (B. de Lesd.) Breuss, concurrently a neotype is also designated. *Placidium boccanum* is reported new for North America and California. *Bacidia coprodes* and *Polycoccum pulvinatum* are reported new for California. *Catillaria subviridis* is verified as occurring in California. *Acarospora rhabarbarina* is no longer recognized as occurring in North America. Seven species are considered endemic to Channel Islands National Park: *Arthonia madreana, Caloplaca obamae, Dacampia lecaniae, Lecania caloplacicola, Lecania ryaniana, Plectocarpon nashii* and *Verrucaria aspecta.* At least 54 species, many of which occur in Mexico, are only known in California from Channel Islands National Park

INTRODUCTION

Channel Islands National Park (heretofore referred to as CINP) in Ventura and Santa Barbara Counties in southern California consists of five islands totalling approximately 346 square miles in area (221331 acres, 89569 ha, 900 km^2). Santa Barabara Island, with an area of 1.02 square miles (639 acres, 259 ha, 2.63 km^2) is the smallest island in CINP. It is a considered a member of the southern islands which include San Nicolas Island, Santa Catalina Island, and San Clemente Island, all outside the boundaries of the national park. The other four islands in CINP are called the northern islands and once formed a single island called Santarosae during a time of lower sea levels in the Pleistocene. They are Anacapa Island (699 acres, 283 ha, 1.14 mi^2, 2.8 km^2), Santa Cruz Island (60,645 acres, 24,542 ha, 96.51 mi^2, 249.95 km^2), Santa Rosa Island (52,794 acres, 21,365 ha, 83.12 mi^2, 215.27 km^2), and San Miguel Island (9,325 acres, 3,774 ha, 14.7 mi^2, 37.74 km^2) (Wikipedia, 2012). None of the islands were ever connected to the mainland of California. The northern islands represent the northwest end of the Transverse Ranges of southern California which include the Santa Monica Mountains and extend southeast to the Little San Bernardino Mountains in Joshua Tree National Park.

The geology of the islands is comprised of various volcanic and sedimentary rocks on San Miguel, Santa Cruz, and Santa Rosa Island with extensive marine terraces. Santa Barbara and Anacapa Island are primarily volcanic rock. Caliche can be found on San Miguel and Santa Rosa Island (Weigand 1998). The oceanic climate and the calcareous and non-calcareous rocks support a diverse community of saxicolous lichens. The marine terraces support biological soil crusts, which were probably extensive, before grazing, erosion, and the introduction of non-native plants. On all of the islands, the cessation of grazing, has allowed biological soil crusts to begin to become reestablished.

Channel Islands National Park hosts approximately 790 plant taxa, of which about 578 are native and 205 are nonnative (CINP 2012). Major native plant communities are coastal sage shrub, maritime

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chaparral, and forests of island oaks, mixed hardwoods, pine, and riparian trees. These plant communities support a rich diversity of epiphytic macrolichens and crusts, including 17 species of *Usnea*. The introduction of non-native animals including sheep, cattle, pigs, and rabbits (the latter on Santa Barbara Island) had a significant impact on vegetation, denuding large parts of the islands and causing greatly increased erosion rates. However non-native animals, as well as introduced elk and deer (both on Santa Rosa Island), have been removed from the CINP. Throughout the islands the native vegetation is regenerating as is the lichen flora. Based on available data all of the lichens reported here are native to CINP.

The only historical collections of lichens from CINP that we have examined are a small number of collections by Blanche Trask from Santa Barbara Island, some which can be found in the Farlow Herbarium at Harvard University (FH) and at New York Botanical Garden (NY). The major modern collections from CINP are those assembled by William Weber (University of Colorad, Boulder; COLO) and Charis Bratt (Smithsonian Institution (US) and Santa Barbara Botanic Garden (SBBG)), beginning in the 1980's. The Sonoran Lichen Flora Project, led by Thomas H. Nash III (Arizona State Univeristy; ASU) and Bruce Ryan (ASU), with the help of Charis Bratt, led to the extensive collection of lichens in the mid-ninties on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Island by an international team of lichenologists. The three volumes of the *Lichen Flora of the Greater Sonoran Desert Region* (Nash et al. 2002, 2004, 2007), written by an international team of more than 80 lichenologists included both the southern and northern Channel Islands as well as the Santa Monica Mountains. It forms the foundation for the study of the lichens and lichenicolous fungi of CINP in the beginning of the 21st century. Our study of CINP began in 2006.

There are a total of 9,361 collections of lichens, lichenicolous fungi, and allied fungi deposited in the four herbaria with significant collections from CINP (ASU, MIN (University of Minnesota), SBBG, and UCR (University of California, Riverside)) (CNALH 2012; UCR Herbarium 2012). These same herbaria contain 51,528 collections from the whole of California. Thus with 18% of the total number of lichen vouchers from California having been collected in CINP, the study area represents the most collected and studied area in the state in terms of Lichenology. Nonetheless, after the publication of the *Lichen Flora of the Greater Sonoran Desert Region*, new records and new species for the CINP continue to be discovered (Knudsen 2008, 2009a–b; Knudsen & Kocourková 2008, 2010; Knudsen & Lendemer 2009; Kocourková & Knudsen 2008, 2009a–c, 2010, 2011; Kocourková et al. 2009, 2012; Kukwa & Knudsen 2011; Lendemer & Knudsen 2010; Lendemer 2010; Lendemer & Hodkinson in review). During our studies, we have also discovered many remaining taxonomic problems that need to be resolved and identifications of specimens that need to be verified or revised, particulairly at SBBG.

Much exploration for lichens also remains to be done in CINP. For instance, the majority of collections from Santa Cruz and Santa Rosa Islands were made only near the main roads. The east end of Santa Cruz Island had not even been visited by lichenologists until our recent fieldwork. There have been no collections on the Middle Island of Anacapa. In fact we estimate that 75% or more of the total area of the islands has never been explored for lichens. Lichenicolous fungi as well as some lichen genera and substrates have also been undercollected, including epiphytic crusts on bark, sterile crusts, and biological soil crusts. There has also been no study of intertidal lichens, which are in danger of extirpation if ocean levels rise rapidly due to global warming.

Several rare lichen species such as *Harpidium nashii* Scheidegger, *Hypogymnia schizidiata* McCune, and *Tornabea scutellifera* (With.) J.R. Laundon may be extirpated and should be the subject of targeted surveys to relocate and map any extant populations. Three species endemic to CINP are currently only known from their type collections and should be the subject of similar investegations. These include *Dacampia lecaniae* Kocourk. and K. Knudsen, *Plectocarpon nashii* Hafellner, and *Toninia nashii* Timdal. The discovery of *Arthonia subdispuncta* Nyl. *ex* Hasse on West Anacapa (Knudsen & Kocourková 2010a), a species apparently extirpated from the Santa Monica Mountains, gives us hope that other rare or extirpated taxa from the Santa Monica Mountains and southern California, such as *Bacidia veneta* S. Elman, *Verrucaria dacryodes* Nyl. *ex* Hasse (Plate 1, Fig. A), and *Rinodina terricola* Sheard and K. Knudsen (Plate 1, Fig. B) will be discovered in CINP. All of these areas of investigation have necessitated the publication of this preliminary checklist of CINP, officially sanctioned by the National Park Service, to guide further exploration, study, and prepare for the eventual publication of a lichen flora of the northern Channel Islands.

MATERIALS AND METHODS

The identification of specimens was based primarily on the *Lichen Flora of the Greater Sonoran Desert Region* (Nash et al. 2002, 2004, 2007), except where other literature is cited for the description of the species in the header or in the notes. The identifications of specimens not seen by the authors were only accepted if made by recognized taxonomic experts, usually the assorted authors of the treatments of the *Lichen Flora of the Greater Sonoran Desert Region*, or our collegue J.C. Lendemer (NY). All the idenifications of Channel Island specimens at SBBG, not verified by taxonomic experts or the authors of the present work, are here excluded from the species list and distribution data until they are revised in the future for a flora of CINP. Specimens at UCR needing further verification were also excluded but are searchable online http://www.herbarium.ucr.edu. Undescribed taxa mentioned in the literature or filed in the herbarium at UCR were also excluded. Verified new additions to the offficial checklist will be published in updates in future volumes of *Opuscula Philolichenum.* Excluded species listed here in the appendix are those that have been published in the literature but not accepted by the us.

Authorities follow *A Cumulative Checklist for the Lichen-forming, Lichenicolous and Allied Fungi of the Continental United States and Canada* including the exclusion of unneccesary abbreviations of authorities with short names (Esslinger 2011). The family level taxonomy follows Lumbsch and Huhndorf (2010) unless other literature is cited. Taxonomic research was carried out during this study at the herbaria ASU, FH, NY, SBBG, UCR.

The terms "central coast" and "central California" used herein refer to the area from Santa Barbara County north to at least Marin County. Species are considered endemic to California or the Channel Islands based on current research and conforming to general California environmental assessment standards. Anacapa Island is comprised of three islets, usually referred to as West, Middle, and East Anacapa. The islets are separated by water and steep cliffs. The information on the distributions of lichens in mainland California is based on the subjective experience and opinions of the authors. Many parts of California are poorly collected or unexplored for lichens as is illustrated by the fact that 18% of the total lichen collections from California available in four major herbaria are derived from CINP. Additionally it should be noted that collectors in the past have favored macrolichens while most taxa in California are crustose (Tucker and Ryan 2006). Global distribution is treated on the continental level. Continental distributions are based on the literature cited for a description of a taxon and the opinion of the authors. We consider species "cosmopolitan" in a very broad sense, when they occur on more than three continents, the term in our usage being synonymous with "widely distributed". The use of the term "cosmopolitan" does not imply that a given species occurs everywhere. It also does not imply that the species is common. Images were captured using an Olympus DP20 digital camera with Microsuite Special Edition. The illustrations were prepared using Adobe Photoshop.

LICHENS, LICHENICOLOUS FUNGI, AND ALLIED FUNGI OF THE NORTHERN CHANNEL ISLANDS

This checklist reports a total of 504 taxa, 498 species, 2 subspecies, 4 varieties, 152 genera, and 56 families (with 6 genera of uncertain placement and 6 genera of anamorphic fungi) from the northern Channel Islands. Of these 448 are lichens, 48 are lichenicolous fungi, and 8 are allied fungi. In this section all lists are arranged alaphbetically by genus and species, or family in the case of Part 4. Throughout the section the asterisk "*" indicates a taxon is a lichenicolous fungus and a dagger "†" indicates a taxon is an allied fungus (i.e., a non-lichenized fungus belonging to one of several groups that have been traditionally treated by lichenologists).

When describing the distributions of individual species in the northern Channel Islands the following abbreviations are used to denote specific islands: A=Anacapa, EA=East Anacapa, SB=Santa Barbara Island, SM=San Miguel Island, SC=Santa Cruz Island, SR=Santa Rosa Island, WA=West Anacapa. As has already been noted above, all species are considered native to the study area and thus this information is not repeated below.

PART 1 – INDICES TO THE ANNOTATED CHECKLIST

To facilitate the use of the annotated checklist a series of indices with minor annotations are provided in this section. These indices include i) a full listing of the taxa treated here with annotations of their distributions within the study area (Part 1A); ii) a listing of only the lichenicolous fungi, again with annotations of their distributions within the study area (Part 1B); iii) a listing of only the allied fungi, also with annotations of their distributions within the study area (Part 1C); and iv) a listing of the families and genera of fungi treated here with notes on the number of species that occur in the study area (Part 1D).

PART 1A - INDEX OF LICHENS, LICHENICOLOUS FUNGI, AND ALLIED FUNGI

Acarospora americana H. Magn. – SR
Acarospora elevata H. Magn. – SC (possibly WA & SR)
Acarospora fuscata (Schrader) Th. Fr. – SC
Acarospora obnubila H. Magn. – SR
Acarospora obpallens (Nyl. *ex* Hasse) Zahlbr. – SC, SR
Acarospora robiniae K. Knudsen – SC, SR
Acarospora schleicheri (Ach.) A. Massal. – SC, SM, SR
Acarospora socialis H. Magn. – EA, SB, SM, SC, SR, WA
Acarospora terricola H. Magn. – SC
Acarospora thamnina (Tuck.) Herre – SC, SR
Acarospora veronensis A. Massal – SC, SR
Adelolecia sonorae Hertel – SM
Amandinea punctata (Hoffm.) Coppins & Scheidegger – EA, SC, SM, SR, WA
Arthonia atra (Pers.) A. Schneider – SM
†*Arthonia beccariana* (Bagl.) Stizenb. – SC, SR
**Arthonia diploiciae* Calat. & Diederich – EA, WA
Arthonia gerhardii Egea & Torrente – SR
Arthonia glebosa Tuck. – SC
Arthonia infectans Egea & Torrente – SR
Arthonia lecanactidea Zahlbr. – WA
Arthonia madreana Egea & Torrente – SR
**Arthonia molendoi* (Heufl. *ex* Frauenf.) R. Sant. – SR
**Arthonia phaeophysciae* Grube & Matzer – SC
Arthonia pruinata (Pers.) A.L. Sm. – EA, SB, SC, SR, WA
†*Arthonia subdispuncta* Nyl. *ex* Hasse – EA
Arthopyrenia lyrata R.C. Harris – SC
†*Arthopyrenia plumbaria* (Stizenb.) R.C. Harris – SR
**Arthrorhaphis aeruginosa* R. Sant. & Tønsberg – SR
Aspicilia glaucopsina (Nyl. *ex* Hasse) Hue – SR
Aspicilia pacifica Owe-Larss. & A. Nordin – EA, SC, SR, WA
Aspicilia phaea Owe-Larss. & A. Nordin – SC, SR
Aspicilia praecrenata (Nyl *ex* Hasse) Hue – SR
Bacidia coprodes (Körb.) Lettau – SR
Bacidia coruscans S. Ekman – SC, SM, SR
Bacidia heterochroa (Müll. Arg.) Zahlbr. – SC, SM, SR
Bacidina californica S. Ekman – SC, SM, SR
Bactrospora acicularis (C.W. Dodge) Egea & Torrente – SC
Bactrospora brevispora R.C. Harris – SC
Bactrospora brodoi Egea & Torrente – SR
Bactrospora patellarioides (Nyl.) Almq. – SC, SR
Bactrospora patellarioides var. *convexa* (B. de Lesd.) Egea & Torrente – SR
Bagliettoa calciseda (DC.) Gueidan & Cl. Roux – SC, SR
Buellia abstracta (Nyl.) H. Olivier – EA, SB, SC, SM, SR, WA
Buellia badia (Fr.) A. Massal. – SR, WA
Buellia capitis-regum W.A. Weber – SC, SM, SR, WA
Buellia christophii Bungartz – SB, SC, SM, SR, WA
Buellia disciformis (Fr.) Mudd – SR
Buellia dispersa A. Massal. – SC, SR
Buellia griseovirens (Turner & Borrer *ex* Sm.) Almb. – SC
Buellia halonia (Ach.) Tuck. – SB, SC, SM, SR, WA

Buellia maritima (Nyl.) Mull. Arg. – SC, SM, SR
Buellia oidalea (Nyl.) Tuck. – SC, SM, SR, WA
Buellia prospersa (Nyl.) Riddle – SM, SR, WA
Buellia pullata Tuck. – EA, SC, SM, SR, WA
Buellia ryanii Bungartz – SC, SM, SR
Buellia sequax (Nyl.) Zahlbr. – SR
Buellia stellulata (Taylor) Mudd – EA, SB(?), SC, SM.SR, WA
Buellia tesserata Körber – SC, SM, SR, SB
**Buelliella inops* (Triebel & Rambold) Hafellner – SB
**Buelliella physciicola* Poelt & Hafellner – SC, SR
Calicium abietinum Pers. – SC
Calicium glaucellum Ach. – SC, SR
Caloplaca ammiospila (Wahlenb.) Th. Fr. – SC, SR
Caloplaca atroflava (Turner) Mong. – SC, SR
Caloplaca bolacina (Tuck.) Herre – EA, SB, SC, SM, SR, WA
Caloplaca brattiae W.A. Weber – SB, SC, SM, SR,WA
Caloplaca catalinae H. Magn. – SC
Caloplaca cerina (Ehrh. ex Hedwig) Th. Fr. – EA, SB, SC, SR, WA
Caloplaca citrina (Hoffm.) H. Olivier – SB, SC, SM, SR
Caloplaca coralloides (Tuck.) Hulting – SB, SC, SM, SR, WA
Caloplaca crenulatella (Nyl.) H. Olivier – SM, SR
Caloplaca durietzii H. Magn. – SC
Caloplaca ferruginea (Hudson) Th. Fr. – SC, SR
Caloplaca ignea Arup – SC, SR
Caloplaca impolita Arup – EA, SB, SC, SR, WA
Caloplaca ludificans Arup – EA, SB, SC, SM, SR, WA
Caloplaca luteominia var. *bolanderi* (Tuck.) Arup – SB, SM, SR,WA
Caloplaca luteominia (Tuck.) Zahlbr. – EA, SB, SM, SR, WA
Caloplaca marina ssp. *americana* Arup – SC, SM
Caloplaca marmorata (Bagl.) Jatta – SM, SR
Caloplaca microphyllina (Tuck.) Hasse – SC
Caloplaca nashii Nav.-Ros., Gaya & Hladun – SR
Caloplaca obamae K. Knudsen – SR
Caloplaca peliophylla (Tuck.) Zahlbr. – SR
Caloplaca pyracea (Ach.) Zwackh – EA, SB, SC, SM, SR
Caloplaca rosei Hasse – SB, SC, SR, SM, WA
Caloplaca saxicola (Hoffm.) Nordin – SC, SR
Caloplaca stanfordensis H. Magn. – EA, SC, SM, SR, WA
Caloplaca stantonii W.A. Weber *ex* Arup – SB, SC, SM, SR, WA
Caloplaca stellata Wetmore & Kärnefelt – SR
Caloplaca stipitata Wetmore – SB, SC, SM, SR
Caloplaca subsoluta (Nyl.) Zahlbr. – SB, SC
Candelaria pacifica M. Westberg & Arup – SC, SR
Candelariella aurella (Hoffm.) Zahlbr. – SM, SR
Candelariella lutella (Vainio) Räsänen – SR
Candelariella vitellina (Hoffm.) Mull. Arg. – SC, SM, SR, WA
Candelariella xanthostigma (Ach.) Lettau – EA, SC, SM, SR
Carbonea latypizodes (Nyl.) Knoph & Rambold – SC
Catillaria chalybeia (Borrer) A. Massal. – SR
Catillaria lenticularis (Ach.) Th. Fr. – SR
Catillaria nigroclavata (Nyl.) Schuler – SM
Catillaria subviridis (Nyl.) Zahlbr. – SC
**Cercidospora cladoniicola* Alstrup – SR
Chrysothrix granulosa G. Thor – SC, SM, SR, WA
Chrysothrix xanthina (Vainio) Kalb – SC, SR
Cladonia chlorophaea (Flörke *ex* Sommerf.) Spreng. – SR, WA

Cladonia hammeri Ahti – SR, WA
Cladonia macilenta Hoffm. – SC, SR
Cladonia maritima K. Knudsen & Lendemer – SC, SR, WA
Cladonia nashii Ahti – SC, SM, SR, WA
Cladonia scabriuscula (Delise) Nyl. – SC, SR, WAS
Cladonia subfimbriata Ahti – SC, SR
Clavascidium lacinulatum (Sch.) M. Prieto. – SC, SR, WA
Cliostomum griffithii (Sm.) Coppins – SC, SM, SR, WA
Collema coccophorum Tuck. – SC, SM, SR
Collema crispum (Hudson) F.H. Wigg. – SC, SR, WA
Collema cristatum (L.) F.H. Wigg. – SM, SR
Collema furfuraceum (Arnold) Du Rietz – SC, SR
Collema nigrescens (Hudson) DC. – SC, SR
Collema tenax (Sw.) Ach. – SC
Collemopsidium sublitoralis (Leighton) Grube & B.D. Ryan – SR
Cresponea chloroconia (Tuck.) Egea & Torrente – SR
Cyphelium brunneum W.A. Weber – SR
**Dacampia lecaniae* Kocourk. & K. Knudsen – WA
**Dactylospora pleiosperma* Triebel – SC, SR
**Dactylospora saxatilis* (Schaerer) Hafellner – SR
Dendrographa alectoroides Sundin & Tehler – SC, SR
Dendrographa leucophaea (Tuck.) Darb. – EA, SB, SC, SM, SR, WA
Dermatocarpon americanum Vainio – SC, SR
Dermatocarpon leptophyllodes (Nyl.) Zahlbr. – SC
Dimelaena californica (H. Magn.) Sheard – SC, SM, SR, WA
Dimelaena radiata (Tuck.) Hale & Culb – EA, SB, SC, SM, SR, WA
Dimelaena weberi Sheard – SB, SC, SM
Diploicia canescens (Dicks.) A. Massal. – EA, SB, SC, SM, SR, WA
Diploschistes actinostomus (Ach.) Zahlbr. – SC, SR, WA
Diploschistes aeneus (Müll. Arg.) Lumbsch – SR
Diploschistes diacapsis (Ach.) Lumbsch – SC, SR, WA
Diploschistes muscorum (Scop.) R. Sant. – SC, SM, SR, WA
Diploschistes scruposus (Schreber) Norman – SB, SC, SR
Diplotomma alboatrum (Hoffm.) Flotow – SM, SR
Diplotomma venustum (Körber) Körber – SM, SR
Dirina catalinariae Hasse – EA, SB, SC, SM, SR, WA
Endocarpon loscosii Müll. Arg. – SM, SR
Endocarpon pallidulum (Nyl.) Nyl. – SB (?)
Endocarpon petrolepidium (Nyl.) Hasse – SC, SR
Endocarpon pusillum Hedwig – SB, SC, SM, SR, WA
Endocarpon simplicatum (Nyl.) Nyl. – SC, SR
**Endococcus matzeri* D. Hawksw. & Iturr. – SR
**Endococcus stigma* (Körb) Stizenb. – SR
**Endococcus thelommatis* Kocourk. & K. Knudsen – SR
Evernia prunastri (L.) Ach. – SC, SM, SR
Flavoparmelia caperata (L.) Hale – SB, SC, SM, SR, WA
Flavopunctelia flaventior (Stirton) Hale – SC, SR
Flavopunctelia soredica (Nyl.) Hale – SC, SR
Fulgensia desertorum (Tomin) Poelt – SR
Fuscopannaria coralloidea P.M. Jørg. – SC, SR
Fuscopannaria praetermissa (Nyl.) P.M. Jørg. – SC, SR
Gyalecta herrei Vězda – SC, SR, WA
Gyalecta jenensis (Batsch) Zahlbr. – EA, SR, WA
Harpidium nashii Scheidegger – SC
Heterodermia erinacea (Ach.) Hale – SC, SR, WA
Heterodermia leucomela (L.) Poelt – SC, SM, SR, WA

Heterodermia namaquana Brusse – SB, SC, SM, SR, WA
Hyperphyscia adglutinata (Flörke) H. Mayrhofer & Poelt – SC
Hyperphyscia confusa Essl., C.A. Morse & S. Leavitt – SC
Hypocenomyce scalaris (Ach. Ex Lilj.) M. Choisy – SC
Hypogymnia gracilis McCune – SC
Hypogymnia heterophylla L. Pike – SC, SR
Hypogymnia imshaugii Krog – SC
Hypogymnia minilobata McCune & Schoch – SC, SR
Hypogymnia mollis L.H. Pike & Hale – SC, SR, WA
Hypogymnia schizidiata McCune – SC, SR
Hypogymnia tubulosa (Schaerer) Hav. – SC
Hypotrachyna afrorevoluta (Krog & Swinscow) Krog & Swinscow – SC
Ingvariella bispora (Nagl.) Guderley & Lumbsch – SR
**Intralichen baccisporus* D. Hawksw. & M.S. Cole – SC, SR
**Intralichen lichenicola* M.S. Christ. & D. Hawksw. – SR
†*Julella vitrispora* (Cooke & Harkness) M.E. Barr – SC
Kaernefeltia merrillii (Du Rietz) Thell & Goward – SC, SR
Koerberia sonomensis (Tuck.) Henssen – SC
Lecanactis californica Tuck. – EA, SC, SM, SR, WA
Lecanactis salicina Zahlbr. – SC
Lecania brunonis (Tuck.) Herre – SB, SC, SM, SR, WA
Lecania caloplacicola B.D. Ryan & v.d. Boom – SR
Lecania cyrtella (Ach.) Th. Fr. – SC, SM, SR
Lecania dudleyi Herre – SB, SC, SM, SR
Lecania franciscana (Nyl. *ex* Hasse) K. Knudsen & Lendemer – SB, SC, SM, SR
Lecania fructigena Zahlbr. – EA, SB, SC, SM, SR, WA
Lecania fuscella (Schaerer) Körber. – EA, SB, SR, WA
Lecania hassei (Zahlbr.) W. Noble – EA, SB, SC, SR, WA
Lecania inundata (Hepp *ex* Körber) M. Mayrhofer – SC, SM, SR
Lecania naegelii Diederich & v.d. Boom – SC, SM, SR
Lecania pacifica Zahlbr. *ex* B.D. Ryan & v.d. Boom – SB, SC, SR
Lecania rabenhorstii (Hepp) Arnold – SR
Lecania ryaniana v.d. Boom – SB, SM, SR
Lecania toninioides Zahlbr. – SM, SR
Lecania turicensis (Hepp) Müll. Arg. – SM, SR, WA
Lecanographa aggregata Egea & Torrente – SR
Lecanographa brattiae (Egea & Ertz) Ertz & Tehler – EA, SB, SC, SM, SR, WA
Lecanographa dimelaenoides (Egea & Torrente) Egea & Torrente – EA, SB, SC, SM, SR, WA
Lecanographa hypothallina (Zahlbr.) Egea & Torrente – EA, SB, SC, SM, SR, WA
Lecanographa insolita Lendemer & K. Knudsen – SR
Lecanographa lyncea (Sm.) Egea & Torrente – SR
Lecanographa lynceoides (Müll. Arg.) Egea & Torrente – SR
Lecanora albella (Pers.) Ach. – SC, SR
Lecanora albocaesiella B.D. Ryan & T.H. Nash – SR
Lecanora andrewii B. de Lesd. – SR
Lecanora brattiae B.D. Ryan & T.H. Nash – SB, SC
Lecanora caesiorubella Ach. – SC, SM, SR
Lecanora californica Brodo – SC, SM, SR
Lecanora campestris (Schaerer) Hue – SC, SR, WA(?)
Lecanora carneolutescens Nyl. – SM
Lecanora comonduensis T.H. Nash & Hertel – SC
Lecanora confusa Almb. – SC, SM, SR
Lecanora crenulata Hook. – SR
Lecanora demosthenesii Lumbsch & Messuti – SC, SM, SR
Lecanora dispersa (Pers.) Sommerf. – SM, SR
Lecanora expallens Ach. – SR

Lecanora gangaleoides Nyl. – SC, SR, WA
Lecanora hagenii (Ach.) Ach. – SC, SM, SR
Lecanora horiza (Ach.) Lindsay – SB, SC, SM, SR, WA
Lecanora laxa (Śliwa & Wetmore) Printzen – SC, SR
Lecanora muralis (Schreber) Rabenh. [= *L. saxicola* (Pollich) Ach.] – SC, SR, WA
Lecanora pacifica Tuck. – SC, SM, SR, WA
Lecanora plumosa Müll. Arg. – SR
Lecanora subcarnea (Lilj.) Ach. – SC, SR
Lecanora subimmergens Vainio – SR
Lecanora subrugosa Brodo – SC
Lecanora substrobilina Printzen – SC, SM, SR
Lecanora verrucariicola B.D. Ryan – SR
Lecanora zosterae (Ach.) Nyl. – SM
Lecidea cruciaria Tuck. – SC, SR
Lecidea diducens Nyl. – SC
Lecidea fuscoatra (L.) Ach. – SC, SR
Lecidea laboriosa Müll. Arg. – SC, SM, SR
Lecidella asema (Nyl.) Knoph & Hertel – EA, SB, SC, SM, SR, WA
Lecidella carpathica Körber – SC, SR
Lecidella elaeochroma (Ach.) M. Choisy – SC, SM, SR
Lecidella granulosula (Nyl.) Knoph & Leuckert – SR
Lecidella meiococca (Nyl.) Leuckert & Hertel – SC, SR
Lecidella scabra (Taylor) Hertel – SR, WA
Lecidella stigmatea (Ach.) Hertel & Leuckert – WA
Lempholemma chalazanum (Ach.) B. de Lesd. – WA
Lepraria lobificans Nyl. – SC, SR
Lepraria neglecta (Nyl.) Erichsen – SR
Lepraria xerophila Tønsberg – SB, SC, SM, SR, WA
Leprocaulon americanum Lendemer & Hodkinson ined. – SB, SC, SM, SR, WA
Leprocaulon knudsenii Lendemer & Hodkinson ined. – SC
Leprocaulon santamonicae (K. Knudsen & Elix) Lendemer & Hodkinson ined. – SR
Leprocaulon terricola (Lendemer) Lendemer & Hodkinson ined. – SC, SR
Leptochidium albociliatum (Desm.) M. Choisy – SC
Leptogium californicum Tuck. – SC
Lichinella robustoides Henssen, Budel & T.H. Nash – SC, SR
Lichinella stipatula Nyl. – SC
**Lichenoconium erodens* M.S. Christ. & D. Hawksw. – SR
**Lichenoconium lecanorae* (Jaap) D. Hawksw. – SR
**Lichenoconium lichenicola* (P. Karst.) Petr. & Sydow – SR
**Lichenodiplis lecanorae* (Vouaux) Dyko & D. Hawksw. – SR
**Lichenodiplis lecanoricola* (M.S. Cole & D. Hawksw.) Diederich – SR
**Lichenostigma amplum* Calat. & Hafellner – SR
**Lichenostigma bolacinae* Nav.-Ros., Calat. & Hafellner – SR
**Lichenostigma cosmopolites* Hafellner & Calat. – SC, SR
**Lichenostigma radicans* Calat. & Barreno – SR
**Lichenostigma rugosum* Thor – SR
**Lichenostigma subradians* Hafellner, Calat. & Nav.-Ros. – SR
**Marchandiomyces corallinus* (Roberge) Diederich & D. Hawksw. – SR
Maronea polyphaea H. Magn. – SC
Megalaria columbiana (G. Merr.) S. Ekman & Tønsberg – SR
Micarea denigrata (Fr.) Hedl. – EA, SC, SR
Micarea nitschkeana (J. Lahm *ex* Rabenh.) Harm. – SM
Mobergia angelica (Stizenb.) H. Mayr. & Sheard – SB, SC, SM, SR, WA
Moelleropsis nebulosa (Hoffm.) Gyeln – SC
**Muellerella lichenicola* (Sommerf. *ex* Fr.) D. Hawksw. – SR
†*Mycocalicium subtile* (Persoon) Szatala – SC, SR

†*Mycocalicium victoriae* (Knight *ex* F. Wilson) Tibell – SC
Myriospora hassei (Herre) K. Knudsen & L. Arcadia – SR
Myriospora scabrida (Hedl. *ex* H. Magn.) K. Knudsen & L. Arcadia – SC
†*Naetrocymbe punctiformis* (Pers.) A. Massal. – WA
Nephroma parile (Ach.) Ach. – SR
Niebla cephalota (Tuck.) Rundel & Bowler – EA, SB, SC, SM, SR, WA
Niebla ceruchis (Ach.) Rundel & Bowler – EA, SB, SC, SM, SR, WA
Niebla ceruchoides Rundel & Bowler – SB, SC, SM, SR, WA
Niebla combeoides (Nyl.) Rundel & Bowler – SB, SC, SM, SR, WA
Niebla homalea (Ach.) Rundel & Bowler – EA, SB, SC, SM, SR, WA
Niebla isidiaescens Bowler, Marsh, T.H. Nash & Riefner – EA, SB, SC, WA
Niebla laevigata Bowler & Rundel – EA, SB, SC, SM, SR, WA
Niebla polymorpha Bowler, J.E. Marsh, T.H. Nash & Riefner – EA, SC
Niebla procera Rundel & Bowler – SB, SC, SM, SR
Niebla robusta (R.H. Howe) Rundel & Bowler – EA, SB, SC, SM, SR, WA
Normandina pulchella (Borrer) Nyl. – SC, SR
Ochrolechia africana Vainio – SR
Ochrolechia arborea (Kreyer) Almb. – SC
Ochrolechia mexicana Vainio – SC
Ochrolechia subpallescens Verseghy – SR
**Opegrapha anomea* Nyl. – SC, SR
Opegrapha herbarum Mont. – EA, SB, SC, SM, SR, WA
Opegrapha niveoatra (Borrer) J.R. Laundon – SC
Opegrapha vulgata (Ach.) Ach. – SR
Parmelia sulcata Taylor – SC, SR
Paraschismatomma ochroleucum (Zahlbr.) K. Knudsen, Ertz & Tehler – SM (historical)
Parmotrema arnoldii (Du Rietz) Hale – SC, SR
Parmotrema hypoleucinum (B. Steiner) Hale – SC, SM, SR, WA
Parmotrema perlatum (Hudson) M. Choisy (syn. *P. chinense* (Osbeck) Hale) – SC, SM, SR, WA
Parmotrema reticulatum (Taylor) M. Choisy – SC, SR
Parmotrema stuppeum (Taylor) Hale – SC, SR
Peltigera collina (Ach.) Schrader – SR
Peltula bolanderi (Tuck.) Wetmore – SB, SR
Peltula corticola Budel & R. Sant. – SC
Peltula euploca (Ach.) Poelt – SC, SR
Peltula farinosa Budel – SC
Peltula obscurans (Nyl.) Gyeln. var. *deserticola* (Zahlbr.) Wetmore – SC, SR
Peltula obscurans var. hassei (Zahlbr.) Wetmore – SR, WA
Peltula omphaliza (Nyl.) Wetmore – SR
Peltula patellata (Bagl.) Swinscow & Krog – SR
Pertusaria amara (Ach.) Nyl. – SC, SR
Pertusaria brattiae Lumbsch & T.H. Nash – SB, SC, SM, SR, WA
Pertusaria californica Dibbins – SR, WA
Pertusaria flavicunda Tuck. – SC, SM, SR, WA
Pertusaria islandica Bratt, Lumbsch & Schmitt – SM
Pertusaria lecanina Tuck. – SC, SR, WA
Pertusaria moreliensis B. de Lesd. – SR
Pertusaria occidentalis Bratt, Lumbsch & Schmitt – SM
Pertusaria ophthalmiza (Nyl.) Nyl. – SC
Pertusaria rubefacta Erichsen – SC, SR
Pertusaria tejocotensis de Lesd. – SC
Pertusaria velata (Turner) Nyl. – SR
Pertusaria xanthodes Müll. Arg. – SC, SR
Phaeophyscia hirsuta (Mereschk.) Essl. – SC, SM, SR
**Phaeosporobolus usneae* D. Hawksw. & Hafellner – SC
Phlyctis speirea G. Merr. – SC

**Phoma cladoniicola* Diederich, Kocourk & Etayo – WA
Physcia adscendens (Fr.) H. Olivier – SB, SC, SR
Physcia aipolia (Ehrh. *ex* Humb.) Furnr. – SB, SC, SR
Physcia biziana (A. Massal.) Zahlbr. – SR
Physcia dimidiata (Arnold) Nyl. – SC, SR
Physcia millegrana Degel. – SR
Physcia neglecta Moberg – SR
Physcia phaea (Tuck.) J.W. Thomson – EA, SB, SC, SR, WA
Physcia subtilis Degel. – SR
Physcia tenellula Moberg – SB, SC, SR, WA
Physcia tribacia (Ach.) Nyl. – SB, SC, SR
Physcia undulata Moberg – SR
Physconia enteroxantha (Nyl.) Poelt – SC, SM, SR, WA
Physconia fallax Essl. – SR
Physconia isidiigera (Zahlbr.) Essl. – SC, SM, SR, WA
Placidium boccanum (Servít) Breuss – SC, SR
Placidium squamulosum (Ach.) Breuss – SC, SR
Placynthiella icmalea Coppins & P. James – SC, SR
Placynthium nigrum (Hudson) Gray – SC
**Plectocarpon nashii* Hafellner – WA
Pleopsidium chlorophanum (Wahlenb.) Zopf – SC
**Polycoccum pulvinatum* (Eitner) R. Sant. – SC
**Polysporina arenacea* (H. Magn.) K. Knudsen & Kocourk. – SR
Polysporina simplex (Davies) Vězda – SC, SR
**Polysporina subfuscescens* (Nyl.) K. Knudsen & Kocourk. – SC, SR
Protoparmelia badia (Hoffm.) Hafellner – SC
Protoparmelia ryaniana v.d. Boom, Sipman & Elix – SC, SR, WA
Pseudosagedia aenea (Wallr.) Hafellner & Kalb – SC, SR
Pseudosagedia cestrensis (Tuck. *ex* Michener) R.C. Harris – SR
Pseudosagedia chlorotica (Ach.) Hafellner & Kalb – SC, SR
Psora brunneocarpa Timdal – SR
Psora pacifica Timdal – SC, SR
Psorotichia schaereri (A. Massal.) Arnold – SR
Punctelia borreri (Sm.) Krog – SC, SR
Punctelia jeckeri (Roum.) Kalb – SC, SR
Pyrrhospora quernea (Dickson) Körber – SC, SM, SR, WA
Pyrrhospora varians (Ach.) R.C. Harris – SC, SR
Ramalina canariensis J. Steiner – EA, SB, SC, SM, SR, WA
Ramalina farinacea (L.) Ach. – SC, SM, SR, WA
Ramalina leptocarpha Tuck. – SC, SM, SR, WA
Ramalina menziesii Taylor – SC, SR
Ramalina pollinaria (Westr.) Ach. – SC, SR
Ramalina subleptocarpha Rundel & Bowler – SB, SC, SM, SR, WA
Rinodina bolanderi H. Magn. – SC, SM, SR, WA
Rinodina brouardii B. de Lesd. – SC
Rinodina californiensis Sheard – SC
Rinodina capensis Hampe *ex* A. Massal. – SC, SR
Rinodina endospora Sheard – SC, SR
Rinodina gennarii Bagl. – EA, SC, SR
Rinodina griseosoralifera Coppins – SM
Rinodina hallii Tuck. – SC
Rinodina herrei H. Magn. – SC, SR
Rinodina innata Sheard – SC, SR
Rinodina intermedia Bagl. – SC, SR
Rinodina marysvillensis H. Magn. – SC, SR
Rinodina oxydata (A. Massal.) A. Massal. – SC

Rinodina pacifica Sheard – SB
Rinodina poeltiana Giralt & W. Obermayer – SC, SR
Rinodina santae-monicae H. Magn. – SC, SR
Roccella gracilis Bory – SB, SR, WA
Roccellina conformis Tehler – SR
Roccellina franciscana (Zahlbr. *ex* Herre) Follmann – SR
**Rosellinella cladoniae* (Anzi) Matzer & Hafellner – SR
Sarcogyne arenosa (Herre) K. Knudsen & Standley – SC, WA
Sarcogyne privigna auct. non (Ach.) A. Massal. – SR
Sarcogyne regularis Körber – SM
†*Sarea resinae* (Th. Fr.) Kuntze – SR
Schizopelte californica Th. Fr. – EA, SB, SC, SM, SR, WA
Schizopelte crustosa Ertz & Tehler – SC, SR
Schizopelte parishii (Hasse) Ertz & Tehler – EA, SB, SC, SM, SR, WA
Scoliciosporum umbrinum (Ach.) Arnold – SR
Seirophora californica (Sipman) Fröden – SB, SM, SR
Sigridea californica (Tuck.) Tehler – SC, SR
**Skyttea pertusariicola* Diederich & Etayo – SR
**Skyttea tavaresiae* R. Sant., Etayo & Diederich – SM
Solenopsora crenata (Herre) Zahlbr. – SB, SC
Sparria cerebriformis (Egea & Torrente) Ertz & Tehler – SC, SR
**Sphinctrina leucopoda* Nyl. – SC, SR
Staurothele areolata (Ach.) Lettau – SR
Staurothele drummondii (Tuck.) Tuck. – SR
Sticta fulginosa (Hoffm.) Ach. – SR
**Stigmidium californicum* K. Knudsen & Kocourk. – EA, SR
**Stigmidium epistigmellum* (Nyl. *ex* Vouaux) Kocourk. & K. Knudsen – EA, SB, SC, SM, SR, WA
**Stigmidium epixanthum* Hafellner – SR, WA
**Stigmidium hesperium* Kocourk., K. Knudsen & Diederich – SR
**Stigmidium pumilum* (Lettau) Matzer & Hafellner – SR
**Stigimidium squamariae* (B. de Lesd.) Cl. Roux & Triebel – SR
**Stigmidium xanthoparmeliarum* Hafellner – SR
**Syzygospora physciacearum* Diederich – SR, WA
Teloschistes chrysophthalmus (L.) Th. Fr. – SC, SR
Teloschistes flavicans (Swartz) Norman – SC, SM, SR
Tephromela atra (Hudson) Hafellner – SC, SM, SR
Tephromela nashii Kalb – SC, SM, SR
Thelenella muscorum (Th. Fr.) Vainio – SC
Thelomma mammosum (Hepp A.) L. Tibell – EA, SB, SC, SM, SR, WA
Thelomma santessonii L. Tibell – SC, SM, SR, WA
Thelopsis isiaca Stizenb. – SC
Toninia aromatica (Turner) A. Massal. – SB, SC, SM, SR
Toninia nashii Timdal – SM, SR
Toninia ruginosa ssp. *pacifica* Timdal – SC, SR
Toninia sedifolia (Scop.) Timdal – SM
**Toninia subdispersa* (Nyl. *ex* Hasse) K. Knudsen – EA, SC, SM, SR, WA
**Toninia subtalparum* v.d. Boom – SR
Topelia californica P.M. Jørg. & Vezda – SC, SR
Tornabea scutellifera (With.) J.R. Laundon – SR
Trapelia coarctata (Turner *ex* Small) M. Choisy – SC, SR
Trapelia glebulosa (Sw.) J.R. Laundon – SC, SR, WA
Trapeliopsis flexuosa (Fr.) Coppins & P. James – SC, SM, SR
Trapeliopsis glaucopholis (Nyl. *ex* Hasse) Printzen & McCune – SC, SR
**Tremella dendrographae* Diederich & Tehler – SR
**Tremella nieblae* Diederich – SR
**Tremella parmeliarum* Diederich – SR, WA

**Tremella ramalinae* Diederich – SC
Tuckermanopsis chlorophylla (Willd.) Hale – SC, SR
Tuckermanopsis orbata (Nyl.) M.J. Lai – SC, SR
Umbilicaria phaea Tuck. – SC, SR
Usnea brasiliensis (Zahlbr.) Motyka – SC
Usnea brattiae P. Clerc – SC, SM, SR
Usnea ceratina Ach. – SC, SR
Usnea cornuta Körber – SC, SR
Usnea dasaea Stirton – SC, SM, SR
Usnea esperantiana P. Clerc – SC, SM, SR
Usnea flavocardia Räsänen – SC, SM, SR, WA
Usnea fragilescens Lynge – SC, SR
Usnea fulvoreagens (Räsänen) Räsänen – SC
Usnea glabrata Vainio – SC, SR
Usnea hirta (L.) F.H. Wigg. – SC
Usnea lapponica Vainio – SC, SM, SR
Usnea mutabilis Stirton – SC
Usnea rubicunda Stirton – SC, SM, SR
Usnea scabrata Nyl. – SC
Usnea subfloridana Stirton – SC, SR
Usnea subscabrosa Nyl. *ex* Motyka – SC
Vahliella californica (Tuck.) P.M. Jørg. – SC
Vahliella labrata (P.M. Jørg.) P.M. Jørg. – SC
Vahliella leucophaea (Vahl.) P.M. Jørg. – SB, SC
Verrucaria adelminienii Zschacke – SR
Verrucaria aspecta Breuss – SR
Verrucaria calkinsiana Servít – SM, SR, WA
Verrucaria cetera Breuss – SM
Verrucaria floerkeana Dalla Torre & Sarnth. – SC, SM
Verrucaria furfuracea (B. de Lesd.) Breuss – SM, SR
Verrucaria fusca Pers. *ex* Ach. – SR
Verrucaria fuscoatroides Servít – SR
Verrucaria mimicrans Servít – SM, SR
Verrucaria muralis Ach. – SM, SR
Verrucaria othmarii (B. de Lesd.) K. Knudsen & L. Arcadia – SC
Verrucaria papillosa Pers. *ex* Ach. – SM, SR
Verrucaria rufofuscella Servít – SR
Verrucaria sandstedei B. de Lesd. – SR
Verrucaria subdivisa Breuss – EA, SB, SC, SM, SR, WA
Verrucaria viridula (Schrader) Ach. – SR
**Vouauxiella lichenicola* (Lindsay) Petr. & Sydow – SR
Wahlenbergiella striatula (Wahlenb.) Gueidan & Thüs – WA
Waynea californica Moberg – SC, SR
Xanthomendoza fallax (Hepp *ex* Arnold) Søchting, Kärnefelt & S.Y. Kondr. – SC, SR
Xanthomendoza fulva (Hoffm.) Søchting, Kärnefelt & S.Y. Kondr. – SM, SR
Xanthomendoza oregana (Gyelnik) Søchting, Kärnefelt & S.Y. Kondr. – SC, SM, SR
Xanthoparmelia commonii Elix & T.H. Nash – SR
Xanthoparmelia cumberlandia (Gyelnik) Hale – SC, SR
Xanthoparmelia lineola (E.C. Berry) Hale – SC, SR
Xanthoparmelia mexicana (Gyelnik) Hale – SC, SR, WA
Xanthoparmelia neotartica Hale – SR
Xanthoparmelia standaertii (Gyelnik) Hale – SC, SR
Xanthoparmelia subramigera (Gyelnik) Hale – SC, WA
Xanthoparmelia verruculifera (Nyl.) O. Blanco et al. – SC, SR
Xanthoria ascendens S.Y. Kondr. – EA, SM, SR, WA
Xanthoria candelaria (L.) Th. Fr. – EA, SB, SC, SM, SR, WA

Xanthoria elegans (Link) Th. Fr. – SR
Xanthoria parietina (L.) Th. Fr. – SB
Xanthoria pollinarioides L. Lindblom & D.M. Wright – SM
Xanthoria polycarpa (Hoffm.) Rieber – SC, SR
Xanthoria tenax L. Lindblom – SB, SC, WA

PART 1B - INDEX OF LICHENICOLOUS FUNGI

**Arthonia diploiciae* Calat. & Diederich – WA
**Arthonia molendoi* (Heufl. *ex* Frauenf.) R. Sant. – SR
**Arthonia phaeophysciae* Grube & Matzer – SC
**Arthrorhaphis aeruginosa* R. Sant. & Tønsberg – SR
**Buelliella inops* (Triebel & Rambold) Hafellner – SB
**Buelliella physciicola* Poelt & Hafellner – SC, SR
**Cercidospora cladoniicola* Alstrup – SR
**Dacampia lecaniae* Kocourk. & K. Knudsen – WA
**Dactylospora pleiosperma* Triebel – SC, SR
**Dactylospora saxatilis* (Schaerer.) Hafellner – SR
**Endococcus matzeri* D. Hawksw. & Iturr. – SR
**Endococcus stigma* (Körb) Stizenb. – SR
**Endococcus thelommatis* Kocourk. & K. Knudsen – SR
**Intralichen baccisporus* D. Hawksw. & M.S. Cole – SR
**Intralichen lichenicola* M.S. Christ. & D. Hawksw. – SR
**Lichenoconium erodens* M.S. Christ. & D. Hawksw. – SR
**Lichenoconium lecanorae* (Jaap) D. Hawksw. – SR
**Lichenoconium lichenicola* (P. Karst.) Petr. & Syd. – SR
**Lichenodiplis lecanoricola* (M.S. Cole & D. Hawksw.) Diederich – SR
**Lichenostigma amplum* Calat. & Hafellner – SR
**Lichenostigma bolacinae* Nav.-Ros., Calat. & Hafellner – SR
**Lichenostigma cosmopolites* Hafellner & Calat. – SC, SR
**Lichenostigma radicans* Calat. & Barreno – SR
**Lichenostigma rugosum* Thor – SR
**Lichenostigma subradians* Hafellner, Calat. & Nav.-Ros. – SR
**Marchandiomyces corallinus* (Roberge) Diederich & D. Hawksw. – SR
**Muellerella lichenicola* (Sommerf. *ex* Fr.) D. Hawksw. – SR
**Opegrapha anomea* Nyl. – SC, SR
**Phaeosporobolus usneae* D. Hawksw. & Hafellner – SC
**Phoma cladoniicola* Diederich, Kocourk. & Etayo – WA
**Plectocarpon nashii* Hafellner – WA
**Polysporina arenacea* (H. Magn.) K. Knudsen & Kocourk. – SR
**Polysporina subfuscescens* (Nyl.) K. Knudsen & Kocourk. – SC, SR
**Roselliniella cladoniae* (Anzi) Matzer & Hafellner – SR
**Skyttea pertusariicola* Diederich & Etayo – SR
**Skyttea tavaresiae* R. Sant., Etayo & Diederich – SM
**Sphinctrina leucopoda* Nyl. – SC, SR
**Stigmidium californicum* K. Knudsen & Kocourk. – EA, SR
**Stigmidium epistigmellum* (Nyl. *ex* Vouaux) Kocourk. & K. Knudsen – EA, SB, SC, SM, SR, WA
**Stigmidium epixanthum* Hafellner – SR, WA
**Stigmidium hesperium* Kocourk., K. Knudsen & Diederich – SR
**Stigmidium pumilum* (Lett.) Matzer & Hafellner – SR
**Stigimidium squamariae* (B. de Lesd.) Cl. Roux & Triebel – SR
**Stigmidium xanthoparmeliarum* Hafellner – SR
**Syzygospora physciacearum* Diederich – SR, WA
**Toninia subdispersa* (Nyl. *ex* Hasse) K. Knudsen – EA, SM, SR, WA
**Toninia subtalparum* v.d. Boom – SR
**Tremella dendrographae* Diederich & Tehler – SR

**Tremella nieblae* Diederich – SR
**Tremella parmeliarum* Diederich – SR, WA
**Tremella ramalinae* Diederich – SC
**Vouauxiella lichenicola* (Lindsay) Petrak & Sydow – SC

PART 1C - INDEX OF ALLIED FUNGI

†*Arthonia beccariana* (Bagl.) Stizenb. – SC, SR
†*Arthonia subdispuncta* Nyl. *ex* Hasse – EA
†*Arthopyrenia plumbaria* (Steinzb.) R.C. Harris – SR
†*Julella vitrispora* (Cooke & Harkness) M.E. Barr – SC
†*Mycocalicium subtile* (Persoon) Szatala – SC, SR
†*Mycocalicium victoriae* (Knight *ex* F. Wilson) Tibell – SC
†*Naetrocymbe punctiformis* (Pers.) A. Massal. – WA
†*Sarea resinae* (Th. Fr.) Kuntze – SR

PART 1D - FUNGAL FAMILIES OF LICHENS, LICHENICOLOUS FUNGI AND ALLIED FUNGI

Acarosporaceae Zahlbr.
- *Acarospora* A. Massal. – 11 species
- *Myriospora* Nägeli *ex* Uloth – 2 species
- *Pleopsidium* Körber – 1 species
- *Polysporina* Vězda – 3 species
- *Sarcogyne* Flotow – 3 species

Arthoniaceae Reichenb.
- *Arthonia* Ach. – 12 species

Arthopyreniaceae W. Watson
- *Arthopyrenia* A. Massal. – 2 species

Arthrorhaphidaceae Poelt & Hafellner
- *Arthrorhaphis* Th. Fr. – 1 species

Candelariaceae Hakul.
- *Candelaria* A. Massal. – 1 species
- *Candelariella* Müll. Arg. – 4 species

Catillariaceae Hafellner
- *Catillaria* A. Massal. – 4 species
- *Solenopsora* A. Massal. – 1 species

Chrysotrichaceae Zahlbr.
- *Chrysothrix* Mont. – 2 species

Cladoniaceae Zenker
- *Cladonia* Hill *ex* P. Browne – 7 species

Collemataceae Zenker
- *Collema* F.H. Wigg. – 6 species
- *Leptogium* (Ach.) Gray – 1 species

Corticiaceae Herter
- *Marchandiomyces* Diederich & D. Hawksw. – 1 species

Dacampiaceae Körber.

Dacampia A. Massal. – 1 species
Polycoccum Saut. *ex* Körber – 1 species

Dactylosporaceae Bellem. & Hafellner
Dactylospora Körber – 2 species

Graphidaceae Dumort. (including *Thelotremataceae* (Nyl.) Stizenb.)
Diploschistes Norman – 5 species

Gyalectaceae (A. Massal.) Stizenb.
Gyalecta Ach. – 2 species

Fuscideaceae Hafellner
Maronea A. Massal. – 1 species

Lecanoraceae Körber.
Carbonea (Hertel) Hertel – 1 species
Lecanora Ach. – 27 species
Lecidella Körber – 7 species
Pyrrhospora Körber – 2 species

Lecideaceae Chevall.
Lecidea Ach. – 4 species

Leprocaulaceae Lendemer & Hodkinson ined.
Leprocaulon Nyl. – 4 species

Lichenotheliaceae Henssen
Lichenostigma Hafellner – 6 species

Lichinaceae Nyl.
Harpidium Körber – 1 species
Lempholemma Körber – 1 species
Lichinella Nyl. – 2 species
Psorotichia A. Massal. – 1 species

Lobariaceae Chevall.
Sticta (Schreber) Ach. – 1 species

Megalariaceae Hafellner
Megalaria Hafellner – 1 species

Megalosporaceae Lumbsch, Feige & K. Schmitz
Aspicilia A. Massal. – 4 species

Mycoblastaceae Hafellner
Tephromela M. Choisy – 2 species

Mycocaliciaceae A.F.W. Schmidt
Mycocalicium Vain. *ex* Reinke – 2 species

Mycosphaerellaceae Lindau
Stigmidium Trevis. – 7 species

Nephromataceae Wetmore *ex* J.C. David & D. Hawksw.
Nephroma Ach. – 1 species

Naetrocymbaceae Höhn. *ex* R. C. Harris
- *Naetrocymbe* Körber – 1 species

Ochrolechiaceae R.C. Harris *ex* Lumbsch & I. Schmitt
- *Ochrolechia* A. Massal. – 4 species

Ophioparmaceae R.W. Rogers & Hafellner
- *Hypocenomyce* M. Choisy – 1 species

Opegraphaceae Stizenb. (generic taxonomy following Ertz and Tehler (2010))
- *Opegrapha* Ach. – 4 species
- *Paraschismatomma* Ertz & Tehler – 1 species
- *Sparria* Ertz & Tehler – 1 species

Pannariaceae Tuck.
- *Fuscopannaria* P.M. Jørg. – 2 species
- *Moelleropsis* Gyeln. – 1 species
- *Vahliella* P.M. Jørg. – 3 species

Parmeliaceae Zenker
- *Evernia* Ach. – 1 species
- *Flavoparmelia* Hale – 1 species
- *Flavopunctelia* Hale – 2 species
- *Hypogymnia* (Nyl.) Nyl. – 7 species
- *Hypotrachyna* (Vainio) Hale – 1 species
- *Kaernefeltia* Thell & Goward – 1 species
- *Parmelia* Ach. – 1 species
- *Parmotrema* A. Massal. – 5 species
- *Protoparmelia* M. Choisy – 2 species
- *Punctelia* Krog – 2 species
- *Tuckermanopsis* Gyelnik – 2 species
- *Usnea* Dill. ex Adans. – 17 species
- *Xanthoparmelia* (Vainio) Hale – 8 species

Peltigeraceae Dumort.
- *Peltigera* Willd. – 1 species

Peltulaceae Büdel
- *Peltula* Nyl. – 6 species, 2 varieties

Pertusariaceae Körber *ex* Körber
- *Pertusaria* DC. – 13 species

Phlyctidaceae Poelt & Vězda *ex* J.C. David & D. Hawksw.
- *Phlyctis* (Wallr.) Flot. – 1 species

Physciaceae Zahlbr. (including Caliciaceae Chevall.)
- *Amandinea* M. Choisy – 1 species
- *Buellia* De Not. – 16 species
- *Calicium* Pers. – 2 species
- *Cyphelium* Ach. – 1 species
- *Dimelaena* Norman – 3 species
- *Diploicia* A. Massal. – 1 species
- *Diplotomma* Flot. – 2 species
- *Heterodermia* Trevis. – 3 species

Hyperphyscia Müll. Arg. – 2 species
Mobergia H. Mayrhofer, Sheard & Matzer – 1 species
Phaeophyscia Moberg – 1 species
Physcia (Schreber) Michx. – 11 species
Physconia Poelt – 3 species
Rinodina (Ach.) Gray – 16 species
Thelomma A. Massal. – 2 species
Tornabea Oesth. – 1 species

Placynthiaceae Å.E. Dahl
Koerberia A. Massal. – 1 species
Leptochidium M. Choisy – 1 species
Placynthium (Ach.) Gray – 1 species

Pilocarpaceae Zahlbr.
Micarea Fr. – 2 species

Porinaceae Reichenb.
Pseudosagedia (Müll. Arg.) M. Choisy – 3 species (following Harris 1995)

Psoraceae Zahlbr.
Psora Hoffm. – 2 species

Ramalinaceae C. Agardh
Adelolecia Hertel & Hafellner – 1 species
Bacidia De Not. – 3 species
Bacidina Vězda – 1 species
Cliostomum Fr. – 1 species
Lecania A. Massal. – 15 species
Niebla Rundel & Bowler – 10 species
Ramalina Ach. – 6 species
Toninia A. Massal. – 5 species, 1 subspecies
Waynea Moberg – 1 species

Roccellaceae Chevall.
Bactrospora A. Massal. – 4 species and 1 variety
Cresponea Egea & Torrente – 1 species
Dendrographa Darb. – 2 species
Dirina Fr. – 1 species
Lecanactis Körber – 2 species
Lecanographa Egea & Torrente – 7 species
Plectocarpon Fée – 1 species
Roccella DC. – 1 species
Roccellina Darb. – 2 species
Schizopelte Th. Fr. – 3 species
Sigridea Tehler – 1 species

Scoliciosporaceae Hafellner
Scoliciosporum A. Massal. – 1 species

Sphinctrinaceae M. Choisy
Sphinctrina Fr. – 1 species

Stereocaulaceae Chevall.
Lepraria Ach. – 3 species

Stictidaceae Fr.
  - *Ingvariella* Guderley & Lumbsch – 1 species (Fernández-Brime et al. 2011)
  - *Thelopsis* Nyl. – 1 species
  - *Topelia* P.M. Jørg. & Vězda – 1 species

Syzygosporaceae Jülich
  - *Syzygospora* G.W. Martin – 1 species

Teloschistaceae Zahlbr.
  - *Caloplaca* Th. Fr. – 28 species, 1 subspecies, 1 varieties
  - *Fulgensia* A. Massal. & De Not. – 1 species
  - *Seirophora* Poelt – 1 species
  - *Teloschistes* Norman – 2 species
  - *Xanthomendoza* S.Y. Kondr. & Kärnefelt – 3 species
  - *Xanthoria* (Fr.) Th. Fr. – 7 species

Thelenellaceae H. Mayrhofer
  - *Julella* Fabre – 1 species
  - *Thelenella* Nyl. – 1 species

Tremellaceae Fr. 1821
  - *Tremella* Pers. – 4 species

Trapeliaceae M. Choisy *ex* Hertel
  - *Placynthiella* Elenkin – 1 species
  - *Sarea* Fr. – 1 species
  - *Trapelia* M. Choisy– 2 species
  - *Trapeliopsis* Hertel & Gotth. Schneider – 2 species

***Umbilicariacea*e** Chevall.
  - *Umbilicaria* Hoffm. – 1 species

Verrucariaceae Zenker
  - *Bagliettoa* A. Massal. – 1 species
  - *Clavascidium* Breuss – 1 species
  - *Dermatocarpon* Eschw. – 2 species
  - *Endocarpon* Hedwig – 5 species
  - *Muellerella* Hepp – 1 species
  - *Placidium* A. Massal. – 2 species
  - *Staurothele* Norman – 2 species
  - *Verrucaria* Schrader – 16 species
  - *Wahlenbergiella* Gueidan & Thüs – 1 species

Genera of Uncertain Placement

Lichenicolous anamorphic fungi
  - *Intralichen* D. Hawksw. & M.S. Cole – 2 species
  - *Lichenodiplis* Dyko & D. Hawksw. – 2 species
  - *Lichenoconium* Petrak & H. Sydow – 3 species
  - *Phaeosporobolus* D. Hawksw. & Hafellner – 1 species
  - *Phoma* Sacc. – 1 species
  - *Vouauxiella* Petr. & Sydow – 1 species

Dothideomycetes
  - *Buelliella* Fink – 2 species
  - *Cercidospora* Körber – 1 species

Endococcus Nyl. – 3 species

Sordariales
Roselliniella Vainio – 1 species

Helotiales
Skyttea Sherwood, D. Hawksw. & Coppins – 2 species

Ascomycetes
Normandina Nyl. – 1 species

PART 2 - ANNOTATED TAXONOMIC CHECKLIST OF LICHENS, LICHENICOLOUS FUNGI, AND ALLIED FUNGI

Acarospora americana H. Magn., Kongl. Vetensk. Svenska Acad. Handl. ser. 3, 7: 198 (1929). Description: Knudsen et al. 2011. Substrate: non-calcareous rock. World distribution: North and South America. CINP distribution: SR.

PLATE 1, FIG. C.

NOTES. – *Acarospora americana* is common in California and throughout North America. It occurs on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, along Army Road, on sandstone, *Knudsen 7411.3 & Baguskus* (UCR).

Acarospora elevata H. Magn., Kongl. Vetensk. Svenska Acad. Handl. ser. 3, 7: 179 (1929). Description: Knudsen 2007a. Substrate: non-calcareous rock, especially granite. World distribution: North America. CINP distribution: SC.

NOTES. – *Acarospora elevata* was described from an H.E. Hasse collection made in the San Gabriel Mountains of southern California. It is common in the Rocky Mountains and frequent in the mountains of southern California. It is currently known from CINP from a single collection from the High Mountains at the east end of Santa Cruz Island. Some poorly developed specimens from Santa Rosa Island and from West Anacapa, identifiable only to genus and with deeply fissured areoles, are probably *A. elevata.*

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Channel Islands National Park, Santa Cruz Island, High Mountains, on small volcanic rock, *Knudsen 12011* (UCR).

Acarospora fuscata (Schrader) Th. Fr., Lich. Scand. 1: 215 (1872). Description: Knudsen 2007a. Substrate: non-calcareous rocks. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – *Acarospora fuscata* is a cosmopolitan species especially common in eastern North America and Europe. In southern California it is frequent in the mountains on north slopes and in watersheds, especially above 3000 feet, but so far appears rare in the Sierra Nevada Mountains and in the coastal ranges of the central coast. In the past, the name was often misapplied to any brown *Acarospora* specimen with gyrophoric/lecanoric acids from North and South America. In CINP it is known from only Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, Sierra Blanca on the way to Ragged Mountain, *Bratt 6411 & Timdal* (ASU, SBBG; det. Knudsen).

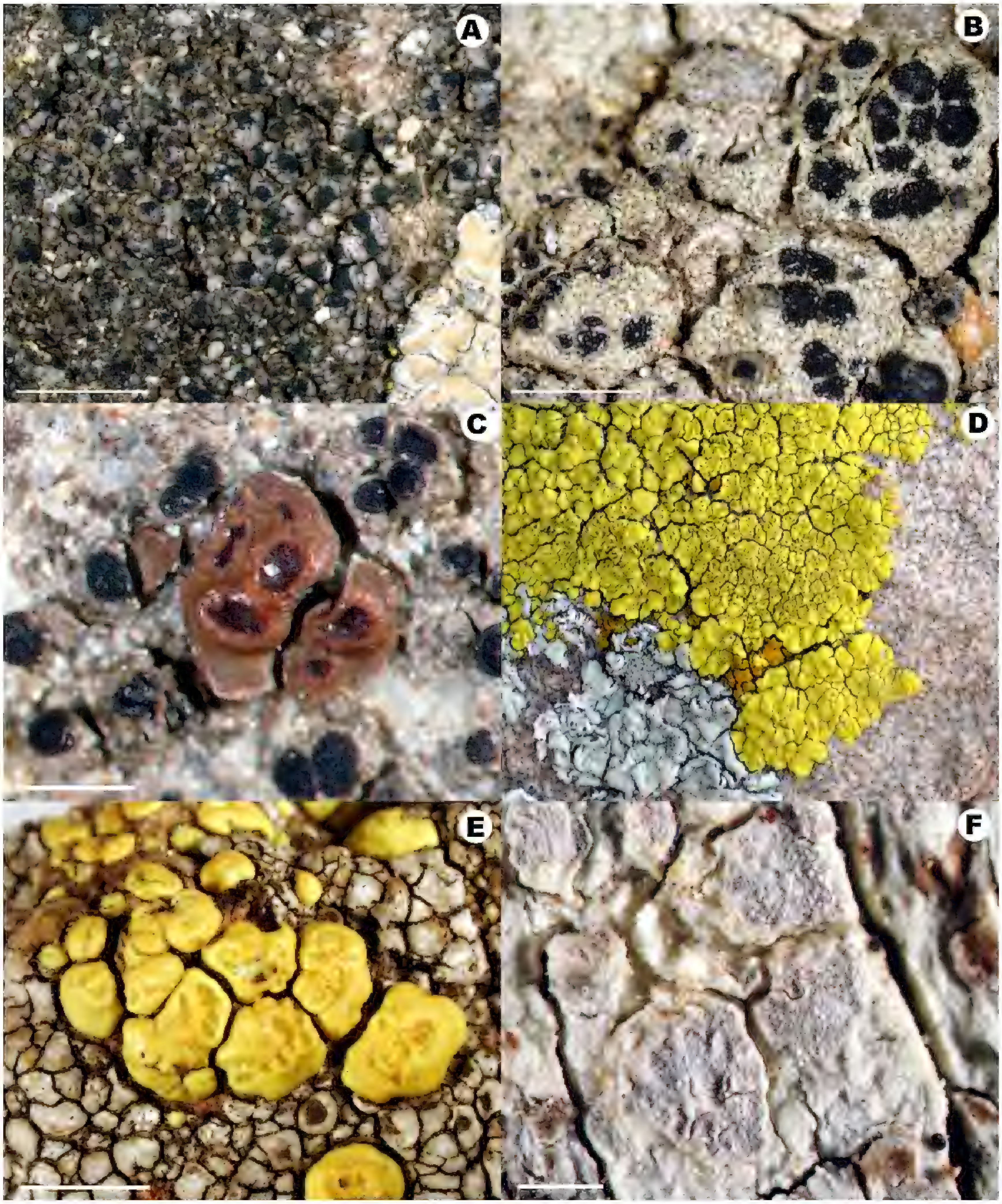

Plate 1, A, *Verrucaria dacryodes* (*Knudsen 11736*, UCR). B, *Rinodina terricola* (*Knudsen 6203*, UCR). C, *Acarospora americana* (*Harris 12143*, NY). D, *A. socialis* (photograph in the field by Jana Kocourková). E, *A. robiniae* (*Schoeninger 411*, UCR). F, *Arthonia pruinata* (*Knudsen 11398*, UCR). Scales = 1.0 mm in A, B, D; 0.5 mm in C and F.

Acarospora obnubila H. Magn., Kongl. Svenska Vetensk. Acad. Handl. ser. 3, 7: 263 (1929). Description**:** Knudsen 2007a. Substrate: non-calcareous rock, sometimes overgrowing other lichens. World distribution: North America. CINP distribution: SR.

NOTES. – *Acarospora obnubila* was described from Arizona and is common in western North America, especially in California. In CINP it occurs on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Quemada Canyon, on rock, *Knudsen 8693.2 & Kocourková* (UCR).

Acarospora obpallens (Nyl. *ex* Hasse) Zahlbr., Beih. Bot. Centralbl. 13: 161 (1902). Description: Knudsen 2007a. Substrate: non-calcareous rock, sandstone, soil. World distribution: North and South America. CINP distribution: SC, SR.

NOTES. – *Acarospora obpallens* was originally described from the city of Santa Monica based on an H.E. Hasse collection growing on soil. The species is primarily saxicolous, but in coastal California is often terricolous, occurring in biological soil crusts. It is common in Arizona and southern California. In CINP it occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, South Point, in well developed biological soil crusts, *Knudsen 114108 & Chaney* (UCR).

Acarospora robiniae K. Knudsen, Lichen Flora of the Greater Sonoran Desert Region 3: 25 (2007). Description: Knudsen 2007a. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SC, SR.

PLATE 1, FIG. E.

NOTES. – *Acarospora robiniae* is the only yellow species of *Acarospora* with gyrophoric acid that occurs in California. It was described from Santa Cruz Island and often grows with *Dimelaena radiata* as in the accompanying figure. The species occurs along the west coast of North America from Morro Rock in central California to Baja California Sur in Mexico. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Quemada Canyon, on rock, *Knudsen 8693.3 & Kocourková* (UCR).

Acarospora schleicheri (Ach.) A. Massal., Ric. Auton. Lich. Crost.: 27 (1852). Description: Knudsen 2007a. Substrate: soil. World distribution: Africa, Europe, North America. CINP distribution: SC, SM, SR.

NOTES. – *Acarospora schleicheri* is a terricolous lichen that occurs in biological soil crusts. It is infrequent throughout California. At the beginning of the 20th century the species was common in Lake Elsinore, the Santa Monica Mountains and Verdugo Hills of southern California (Hasse 1913). It is still widespread in southern California but is rare at all of the sites we have recently studied. This taxon is the best evidence we have for a historical reduction of terricolous habitats and late successional biological soil crusts in southern California. The name *A. schleicheri* was misapplied by W.A. Weber to all species of yellow *Acarospora* (Knudsen 2004). *Acarospora schleicheri* is rare on San Miguel, Santa Cruz, and Santa Rosa Islands. It was probably almost extirpated by sheep and cattle grazing as well as the subsequent erosion of large areas.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on soil, *Knudsen 10584* (UCR).

Acarospora socialis H. Magn., Mycologia 21: 252 (1929). Description: Knudsen 2007a. Substrate: non-calcareous rock, rarely on consolidated soil, wood of a fence (only on Santa Rosa Island). World distribution: North America. CINP distribution: EA, WA, SM, SB, SC, SR.

PLATE 1, FIG. D.

NOTES.– This polymorphic yellow *Acarospora* was originally described from Santa Catalina Island. When well developed, it is easily identified by its stipe and yellowish underside (when not darkened by substrate interactions), but it is often depauperate. In some stressful situations it rarely produces a stipe, for instance when it occurs directly on coast above the spray zone or on hard vertical granite in full sun. The species produces abundant pycnidia and many populations are sterile. This is the most common yellow *Acarospora* in western North America and is a dominant in the Mojave and Sonoran Deserts. It is common on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. VENTURA CO.: East Anacapa Island, on rock, *Knudsen 5320* (UCR).

Acarospora terricola H. Magn., Kongl. Vetensk. Svenska Acad. Handl., ser. 3, 7: 157 (1929). Description: Knudsen 2007a. Substrate: soil, rarely on decaying non-calcareous rocks. World distribution: North America. CINP distribution: SC.

NOTES. – *Acarospora terricola* was originally described from an H.E. Hasse collection made in the Santa Monica Mountains. The species is frequent on soil in southern California biological soil crusts. It is rare on the north Channel Islands where it is known from a single collection from Santa Cruz Island. This is another terricolous species that has probably been almost extirpated from the Channel Islands by grazing.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, ridge south of Canada Cervida, in biological soil crust, *Knudsen et al. 8577* (UCR).

Acarospora thamnina (Tuck.) Herre, Bot. Gaz. 51: 290 (1911). Description: Knudsen 2007a. Substrate: non-calcareous rock. World distribution: Europe, North America. CINP distribution: SC, SR.

NOTES. – *Acarospora thamnina* is common throughout the mountains of central and southern California. In it CINP is known from Santa Cruz and Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA**. Santa Rosa Island, below Black Mountain, on rock, *Wetmore 73533* (ASU, MIN; det. Knudsen).

Acarospora veronensis A. Massal., Ric. Auton. Lich. Crost.: 29, nr. 45, fig. 48 (1852). Description: Knudsen 2007a (where it was lumped with *A. americana*, the illustration of *A. vernonensis* in that work corresponds to *A. americana*); Knudsen et al. 2011 (revision distinguishing *A. americana* and *A. veronensis*). Substrate: non-calcareous rock. World distribution: Europe, North America. CINP distribution: SC, SR.

NOTES. – This taxon is a small brown *Acarospora* species that is easily confused with *A. americana* (which is more common in California). *Acarospora veronensis* is known from Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Lopez Road above Jolla Vieja Canyon, on rock, *Knudsen 8777* (UCR).

Adelolecia sonorae Hertel, Lichen Flora of the Greater Sonoran Desert Region 2: 17 (2004). Description: Hertel 2004. Substrate: noncalareous rock. World distribution: North America. CINP distribution: SM.

NOTES. – *Adelolecia sonorae* is currently only known from the type locality in Baja Sur in Mexico and in California from San Miguel Island.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: San Miguel Island, Green Mountain, *Nash 41442* (ASU).

Amandinea punctata (Hoffm.) Coppins & Scheidegger *in* Scheidegger, Lichenologist 25: 343 (1993). Description: Bungartz et al. 2007 (as *Buellia punctata*). Substrate: bark and wood, fences, not on rock in our area but commonly on rocks in Europe and eastern North America. World distribution: cosmopolitan (but probably heterogeneous). CINP distribution: EA, SC, SM, SR, WA.

NOTES. – *Amandinea punctata* is one of the most common lichens in California. Its lecideine apothecia often cover the branches of trees and shrubs. In California it is often the only corticolous species in polluted areas. Interestingly it appears to also be a pioneer species, quickly reentering disturbed areas. Current molecular data does not apparently support the genus *Amandinea* as separate from *Buellia* (Scheidegger 2009) but this is not broadly accepted in Europe or North America. According to Bungartz et al. (2007) specimens from California may represent two taxa. *Buellia schaereri* De Not., which has shorter, thinner ascospores and hardly any visible thallus, may also grow on bark on the Channel Islands. In CINP *A. punctata* occurs on East and West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: East Anacapa Island, on unknown dead shrub, *Knudsen 5287* (UCR).

Arthonia atra (Pers.) A. Schneider, A Guide to the Study of Lichens: 131 (1898). Description: Ertz and Egea 2007 (as *Opegrapha atra*). Substrate: bark. World distribution: cosmopolitan. CINP distribution: SM.

NOTES. – *Arthonia atra* is rare in California, with most of the collections from the central California coast and Santa Catalina Island. It is only known from San Miguel Island.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: San Miguel Island, Willow Canyon, on willows, *Nash 41317* (ASU; det. Ertz).

†***Arthonia beccariana*** (Bagl.) Stizenb., Ber. Tätigk. St. Gall naturw. Gesellsch. 1889/90: 200 (1891). Description: Grube 2007. Substrate: smooth bark. World distribution: Europe, North America. CINP distribution: SC, SR.

NOTES. – The non-lichenized fungus *Arthonia beccariana* is infrequent in southern California. It was collected on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. Santa Rosa Island, Cherry Canyon, on bark, *Sundin 1466* (ASU).

Arthonia diploiciae* Calat. & Diederich, Mycotaxon 65: 366 (1995). Description: Grube 2007. Substrate: *Diploicia canescens.* World distribution: Africa, Europe, North America. CINP distribution: EA, WA.

NOTES. – This lichenicolous fungus is parasitic on *Diploicia canescens,* which is common on all of the Channel Islands. *Arthonia diploiciae* occurs on East and West Anacapa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. VENTURA CO.: West Anacapa Island, above Rat Rock, on *Diploicia canescens, Kocourková & Knudsen* (PRM 915316).

Arthonia gerhardii Egea & Torrente, Flechten Follmann: 195 (1995). Description: Grube 2007. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SR.

NOTES. – The grayish-white thallus of *Arthonia gerhardii* looks similar to *A. infectans* and occurs in the same communities. It is a rare species, known from only from Baja California and Santa Rosa Island. We have not located any extant populations in Channel Islands National Park.

No vouchers were examined for this study.

Arthonia glebosa Tuck., Gen. Lich.: 221 (1872). Description: Grube 2007. Substrate: soil. World distribution: Asia, North America. CINP distribution: SC.

NOTES. – *Arthonia glebosa* is infrequent in central and southern California in biological soil crusts. It occurs on Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, Islay Canyon, *Bratt 3069 & Larson* (SBBG).

Arthonia infectans Egea & Torrente, Flechten Follmann: 196 (1995). Description: Grube 2007. Substrate: non-calcareous rock, lichens. World distribution: North America (California endemic). CINP distribution: SR.

NOTES. – *Arthonia infectans* is a rare endemic species only known from three sites: the type locality in Monterey County, Arlington Canyon on Santa Rosa Island, and Point Dume in the Santa Monica Mountains. It has a white thallus with C+ red reaction caused by an unknown exolite and ascospores with 3-to-4 septa. It is a juvenile parasite on *Lecanographa hypothallina* and *Sparria cerebriformis* (Kocourková et al. 2012), developing an independent lichenized thallus.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Arlington Canyon, on *Lecanographa hypothallina*, *Knudsen et al. 8721* (UCR).

Arthonia lecanactidea Zahlbr., Beih. Bot. Centralbl. 13: 155 (1902). Description: Grube 2007. Substrate: smooth bark. World distribution: North America (California endemic). CINP distribution: WA.

NOTES. – *Arthonia lecanactidea* is a little known California endemic that grows on the smooth bark of coastal chaparral, possibly only on *Lycium californicum* Nutt., the phorophyte of the type collection. It was originally collected in San Pedro at White Point by H.E. Hasse. In CINP it occurs on West Anacapa Island.

Voucher. – **U.S.A. CALIFORNIA**. VENTURA CO.: West Anacapa Island, above Rat Rock, on *Lycium californica*, *Knudsen 10646 & Kocourková* (UCR).

Arthonia madreana Egea & Torrente, Flechten Folimann: 199 (1995). Description: Grube 2007. Substrate: non-calcareous rock. World distribution: North America (California endemic). CINP distribution: SR.

NOTES. – *Arthonia madreana* is endemic to Santa Rosa Island and is currently known from only a single population in Lobo Canyon.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on rock, *Knudsen 11397* (UCR).

***Arthonia molendoi** (Heufl. *ex* Frauenf.) R. Sant., Thunbergia 3: 2 (1986). Description: Grube 2007. Substrate: *Caloplaca* and *Xanthoria* species. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Arthonia molendoi* is lichenicolous on *Caloplaca* and *Xanthoria* species. It is probably frequent in California (Kocourková et al. 2012). In CINP it occurs on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, on *Caloplaca coralloides*, *Kocourková & Knudsen s.n.* (PRM 909650).

***Arthonia phaeophysciae** Grube & Matzer, Bibl. Lichenol. 68: 10 (1997). Description: Grube 2007. Substrate: *Phaeophyscia*. . World distribution: Europe, North America. CINP distribution: SC.

NOTES. – The lichenicolous fungus *Arthonia phaeophysciae* is probably infrequent in California. In CINP it occurs on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, Central Valley, on *Phaeophyscia hirsuta* on exposed oak root, *Weber & Bratt s.n.* (GZU; det. Hafellner).

Arthonia pruinata (Pers.) Steud. *ex* A.L. Sm., Monogr. Brit. Lich. 2: 214 (1911). Description: Grube 2007. Substrate: bark, especially on oaks. World distribution: Africa, Europe, North America. CINP distribution: EA, SB, SC, SR, WA.

PLATE 1, FIG. F.

NOTES. – *Arthonia pruinata* is the most common lichenized *Arthonia* on trees in coastal California. It occurs on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on mature bark of *Heteromeles arbutifoli*a, *Knudsen 11928* (UCR).

†***Arthonia subdispuncta*** Nyl. *ex* Hasse, Bull. Torrey Bot. Club 24: 448 (1897). Description: Grube 2007. Substrate: caudex of *Leptosyne gigantea*. World distribution: North America (California endemic). CINP distribution: EA.

NOTES. – The non-lichenized fungus *Arthonia subdispuncta* is a symbiont on the caudex of *Leptosyne gigantea* Kellogg. The species was described from Point Dume in the Santa Monica Mountains where it is now extirpated. It is currently only known in California from East Anacapa Island.

Selected voucher. – **U.S.A. CALIFORNIA**. VENTURA CO.: East Anacapa Island, on *Leptosyne gigantea, Knudsen 10748* (UCR).

Arthopyrenia lyrata R.C. Harris *in* Tucker & R.C. Harris, Bryologist 83: 6 (1980). Description: Aptroot 2002a. Substrate: bark. World distribution: North America. CINP distribution: SC.

NOTES. – *Arthopyrenia lyrata* forms beautiful white patches on the smooth bark of phorophytes. It is common on the central coast of California. The species is considered part of the subtropical element in the California lichen biota and in CINP it occurs on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, Islay Canyon, *Weber 80225* (ASU; det. Aptroot).

†***Arthopyrenia plumbaria*** (Stizenb. *ex* Hasse) R.C. Harris *in* Egan, Bryologist 90: 163 (1987). Description: Aptroot 2002a. Substrate: bark, sometimes wood. World distribution: North America. CINP distribution: SR.

NOTES. – The usually non-lichenized *Arthopyrenia plumbaria* is infrequent along the coast of western North America. In CINP it occurs on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, between Cow and Lobo Canyon, on *Baccahris* wood, *Knudsen et al. 10558* (UCR).

****Arthrorhaphis aeruginosa*** R. Sant. & Tønsberg, Lichenologist 26: 295 (1994). Description: Santesson & Tønsberg 1994. Substrate: *Cladonia* species. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – *Arthrorhaphis aeruginosa* is lichenicolous on *Cladonia* species where it forms a distinctive blue infection. It is currently only known in California from a single fertile collection made on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, on *Cladonia* species, *Kocourková & Knudsen s.n.* (PRM 909678, UCR).

Aspicilia glaucopsina (Nyl. *ex* Hasse) Hue, Lich. Morphol. et Anat. 112 (1912). Description: Owe-Larsson et al. 2007. Substrate: soil (including serpentine), *Selaginella bigloveii,* disintegrating granite and crumbling sandstone. World distribution: North America (California endemic). CINP distribution: SR.

NOTES. – *Aspicilia glaucopsina* is infrequent in southern and central California. The type of *Aspicilia glaucopsina* was collected by H.E. Hasse on decaying granite in the Santa Monica Mountains (Hasse 1913). *Aspicilia glaucopsina* is usually terricolous, occurring especially in biological soil crusts on the terraces created by California spike moss, *Selaginella bigloveii* L. Underw. It often coats the branches of spike moss creating impressive specimens. It is an indicator species of Spike Moss Terrace, a successional biological soil crust community in California (Hernandez & Knudsen 2012). It occurs on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, South Point, on soil, *Knudsen 11417 & Chaney* (UCR).

Aspicilia pacifica Owe-Larss. & A. Nordin, Lichen Flora of the Greater Sonoran Desert Region, 3: 97 (2007). Description: Owe-Larsson et al. 2007. Substrate: non-calcareous rocks. World distribution: North America. CINP distribution: EA, SC, SR, WA.

PLATE 2, FIG. A.

NOTES. – *Aspicilia pacifica* is a common maritime species along the coast from Baja California to at least as far north as Monterey County. The type of *A. pacifica* was collected on Santa Cruz Island. Some specimens have low concentrations of exolites and the spot text reaction is best seen in squash preparations under a light microscope. It is common on Anacapa, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. VENTURA CO.: West Anacapa Island, on basalt, *Knudsen 10860* (UCR).

Aspicilia phaea Owe-Larss. & A. Nordin, Lichen Flora of the Greater Sonoran Desert Region, 3: 100 (2007). Description: Owe-Larsson et al. 2007. Substrate: non-calcareous rocks. World distribution: North America (California endemic). CINP distribution: SC, SR.

NOTES. – *Aspicilia phaea* is common in California from low to high elevations. It probably also occurs in Mexico. In CINP it occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, near Christi Pines, *Knudsen et al. 8567* (UCR).

Aspicilia praecrenata (Nyl *ex* Hasse) Hue, Lich. Morphol. et Anat. 112 (1912). Description: Owe-Larsson et al. 2007. Substrate: soil in biological soil crusts, rarely on decayed rock or sandstone. World distribution: North America (California endemic). CINP distribution: SR.

Plate 2, Fig. B.

NOTES. – *Aspicilia praecrenata* is rare in California where it occurs in biological soil crusts and forms a thick squamulose thallus. It can also grow on soft decaying rocks where it will typically produce a poorly developed thallus. The species was originally described from the Santa Monica Mountains from same type locality as *A. glaucopsina* (Hasse 1913). *Aspicilia praecrenata* will eventually be transferred to the genus *Circinaria* (A. Nordin, pers. comm.). In CINP it occurs on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, South Point, in biological soil crusts, *Knudsen 11411 & Chaney* (NY, UCR, UPS).

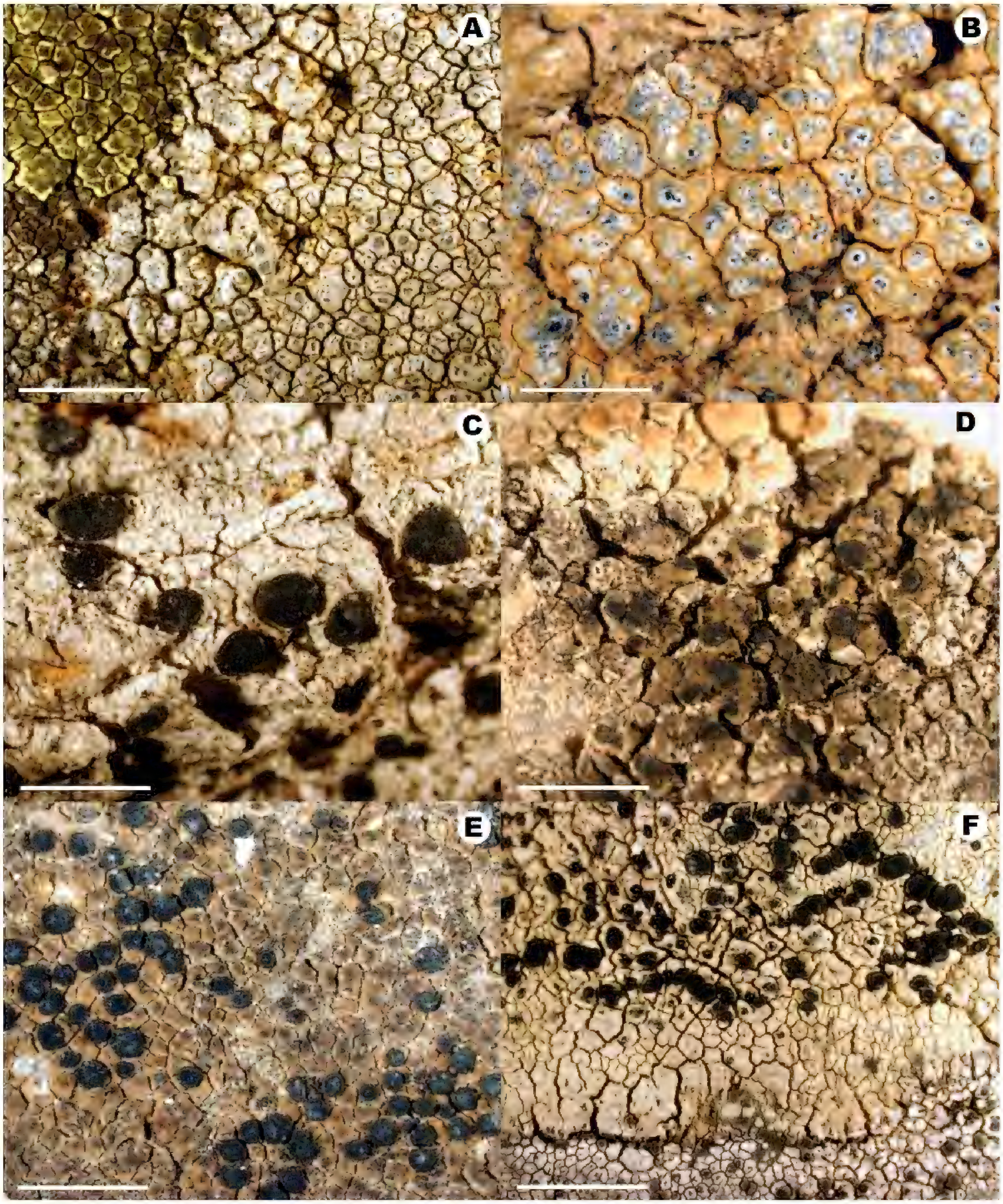

Plate 2, A, *Aspicilia pacifica* (*Knudsen 8776*, UCR). B, *A. praecrenata* (*Knudsen 11411*, UCR). C, *Bacidia coruscans* (*Knudsen 10617*, UCR). D, *Buellia badia* (*Knudsen 8070*, UCR). E, *Buellia christophii* (*Nash 12952*, UCR). F, *B. halonia* (*Knudsen 7365*, UCR). Scales = 2.0 mm in A and F; 1.0 mm in B-E.

Bacidia coprodes (Körber) Lettau, Hedwigia 52: 132 (1912). Description: Llop & Ekman 2007. Substrate: calcareous rock. World distribution: Antarctica, Europe, North America. CINP distribution: SR.

NOTES. – *Bacidia coprodes* is a saxicolous member of the genus, with a red paraplectenchymatous hypothecium, blue-green epihymenium, and relatively broad 3-septate hyaline ascospores. It occurs on Santa Rosa Island in CINP. The species is here reported new for California. It was also collected in Joshua Tree National Park in Keys Ranch. It is probably undercollected.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Carrington, on sandy reconsolidated soil, *Knudsen et al. 8878* (UCR).

Bacidia coruscans S. Ekman, Lichen Flora of the Greater Sonoran Desert Region, 3: 23 (2004). Description: Ekman 2004a. Substrate: twigs and branches of various shrubs and trees. World distribution: North America. CINP distribution: SC, SM, SR.

PLATE 2, FIG. C.

NOTES. – *Bacidia corusans* occurs on a wide variety of shrubs including *Baccharis,* particularly on dead branches and bushes. It was recently described from San Miguel Island were it was found on *Lupinus albifrons* Benth. (Ekman 2004). It is rare on the mainland with scattered populations from Baja California to Point Reyes. In 1915, shortly before his death, H.E. Hasse collected it on *Juglans californica* in the Santa Monica Mountains and wrote on the packet "rare" (FH!). Based on our studies in the region the taxon is probably extirpated from the Santa Monica Mountains, but it is still common on San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Miguel Island, on *Artemisia californica*, *Printzen s.n.* (ASU; det. Printzen).

Bacidia heterochroa (Mull. Arg.) Zahlbr., Cat. Lich. Univ. 4: 204 (1926). Description: Ekman 2004a. Substrate: bark. World distribution: Pantropic, cosmopolitan. CINP distribution: SC, SM, SR.

NOTES. – *Bacidia heterochroa* appears to be particularly frequent from San Francisco north to Sonoma County. It occurs on San Miguel, Santa Cruz and Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Black Mountain area, on *Heteromeles arbutifolia, Nash 32640* (ASU, det. Ekman).

Bacidina californica S. Ekman, Op. Bot. 127: 117 (1996). Description: Ekman 2004b. Substrate: bark. World distribution: North America (California endemic). CINP distribution: SC. SM, SR.

NOTES. – *Bacidina californica* is a California endemic known from scattered coastal populations as far north as Sonoma County and is frequent at Point Lobos in Monterey County. Though not known from the Channel Islands, *B. ramea* S. Ekman was collected several times in the Santa Monica Mountains by H.E. Hasse (FH!) and may be expected to occur on the islands. If the narrow thalline margin is not observed, it may be confused with *B. californica.* This species is common on San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: San Miguel Island, Green Mountain, on *Astragulus, Knudsen 6798* (UCR).

Bactrospora acicularis (C.W. Dodge) Egea & Torrente, Lichenologist 25: 219 (1993). Description: Egea et al. 2004a. Substrate: bark of trees, particularly oaks. World distribution: North and South America. CINP distribution: SC.

NOTES. – In the context of the California lichen biota, *Bactrospora acicularis* belongs to the American Mediterranean biogeographical unit, occurring in both Mediterranean areas of the Americas (Chile and California). In Chile *B. acicularis* has been collected on non-native *Eucalyptus* trees. In

California it is only known from CINP. Charis Bratt collected it several times in the Central Valley of Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, Central Valley, *Bratt 6484* (NY; det. Lendemer).

Bactrospora brevispora R.C. Harris, Some Florida Lichens: 39 (1990). Description: Egea et al. 2004a. Substrate: bark, wood. World distribution: North America, Caribbean. CINP distribution: SC.

NOTES. – *Bactrospora brevispora* is part of the subtropical biographical unit of the California lichen biota. It is only known from a single collection made on Santa Cruz Island where it was found on oaks (*Quercus agrifolia* Née).

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, Cañada del Puerto, *Nash 32436* (ASU; det. Nordin).

Bactrospora brodoi Egea & Torrente, Lichenologist 25: 224 (1993). Description: Egea et al. 2004a. Substrate: bark. World distribution: North America. CINP distribution: SR.

NOTES. – *Bactrospora brodoi* is frequent in eastern Canada but rare along the central coast of California. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Old Ranch Canyon, on *Heteromeles arbutifolia*, *Nash 33095* (ASU; det. Egea and Torrente).

Bactrospora patellarioides (Nyl.) Almq., Sci. Nat. Cherbourg 2: 333 (1869). Description: Egea et al. 2004a. Substrate: bark, wood. World distribution: Africa, Europe, North America. CINP distribution: SC, SR.

NOTES. – *Bactrospora patellarioides* is rare along the coast of California where it is currently known only from the Santa Monica Mountains. It is common on the Channel Islands where it grows on both native and non-native trees. The California endemic *B. spiralis* Egea & Torrente occurs along the coast from Point Loma in San Diego County to Monterey and is expected on the Channel Islands, although it has not yet been found there. *Bactrospora patellarioides* is frequent on Santa Cruz and Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on *Quercus pacifica*, *Knudsen et al. 7831* (UCR).

Bactrospora patellarioides var. ***convexa*** (B. de Lesd.) Egea & Torrente, Lichenologist 25: 249 (1993). Description: Egea et al. 2004a. Substrate: bark. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – *Bactrospora patellarioides* var. *convexa* is narrowly distinguished from the typical variety *patellarioides*. In CINP it occurs on oaks on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, East Point, on oak bark, *Wetmore 73784* (ASU; det. Tehler).

Bagliettoa calciseda (DC.) Gueidan & Cl. Roux, Bulletin de la Société Linnéenne de Provence 58: 187 (2007). Description: Breuss 2007 (as *Verrucaria calciseda*). Substrate: caliche, limestone, Monterey shale. World distribution: Cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Bagliettoa calciseda* is a strict calciphile known from scattered locations in California (Breuss 2007). It is rare on Santa Rosa Island where it occurs on caliche and and also on east Santa Cruz Island where it occurs on Monterey shale.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Sandy Point, on caliche, *Knudsen et al. 8790* (UCR).

Buellia abstracta (Nyl.) H. Olivier, Bull. Acad. Intern. Géogr. Bot. 12: 176 (1903). Misapplied name: *B. sequax* auct. Description: Bungartz et al. 2007 (as *B. sequax*). Substrate: non-calcareous rock. World distribution: Europe, North America. CINP distribution: EA, SB, SC, SM, SR, WA.

NOTES. – *Buellia abstracta* is the most frequent saxicolous *Buellia* species in California, occurring in a wide range of habitats. The species is distinguished by its dark thin-walled ellipsoid ascospores, which only become ornamented when mature, and often abundant small black lecideine apothecia with an endolithic or a pale gray or brown thallus mixed with grains of the substrate. Its production of norstictic acid varies in concentration and specimens without norstictic acid are common in southern California. The name *Buellia sequax* was misapplied to this species (Giralt et al. 2011). It is common on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: San Miguel Island, Willow Canyon, on rock, *Knudsen 6810.2* (UCR).

Buellia badia (Fr.) A. Massal., Memor. Lichenogr. 1853: 124–125 (1853). Description: Bungartz et al. 2007. Substrate: lichens, non-calcareous rock, rarely on wood or bark in eastern North America. World distribution: Africa, Europe, North America. CINP distribution: WA, SR.

PLATE 2, FIG. D.

NOTES. – *Buellia badia* is common in California. It begins as a non-lichenized juvenile parasite, infiltrating the thallus of many different lichen genera, and destroying them. In the early stages of infection the apothecia of *B. badia* sometimes form on the host and can be identified by their 1-septate brown ascospores and ascus structure, which has a wide I- cone usually with parallel blue flanks. Eventually *B. badia* forms an independent dull brown non-lobate lichenized crust, which is sometimes bullate to squamulose and lacks lichen substances. In California it is usually parasitic on *Aspicilia* species. It occurs on West Anacapa and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, boulder field above Ford Point, *Knudsen et al. 10496* (UCR).

Buellia capitis-regum W.A. Weber, Bryologist 74: 185 (1971). Descriptions: Bungartz et al. 2007. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SC, SM, SR. WA.

NOTES. – *Buellia capitis-regum* occurs from Marin County south to Baja California. It is distinguished by its beautiful thick white thallus with a yellow medulla. It is common on San Miguel, Santa Cruz, Santa Rosa, and West Anacapa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, nameless canyon along Smith Highway, on rock, *Knudsen 8864.1 & Kocourková* (UCR).

Buellia christophii Bungartz, Canad. J. Bot. 82: 542 (2004). Descriptions: Bungartz et al. 2007. Substrate: non-calcareous rocks. World distribution: North America. CINP distribution: SB, SC, SM, SR, WA.

PLATE 2, FIG. E.

NOTES.– *Buellia christophii* is frequent along the coast of southern and central California. It is frequent on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, between East End and Torrey Pine forest, on sandstone, *Knudsen 7422 & Baguskus* (UCR).

Buellia disciformis (Fr.) Mudd, Man. Brit. Lich.: 261 (1861). Description: Bungartz et al. 2007. Substrate: bark, rarely wood. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – *Buellia disciformis* is infrequent in southern California, though often locally abundant on chaparral. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, north of Black Mountain, on *Quercus pacifica*, *Knudsen et al. 7683* (UCR).

Buellia dispersa A. Massal., Schedul. Critic. 8: 150 (1856). Description: Bungartz et al. 2007. Substrate: non-calcareous rock. World distribution: Africa, Europe, North America. CINP distribution: SC, SR.

NOTES. – *Buellia dispersa* is frequent in California, especially in the southwestern Mojave Desert. It occurs on Santa Cruz and Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Old Ranch Canyon, *Wetmore 73810* (MIN).

Buellia griseovirens (Turner & Borrer ex. Sm.) Almb., Bot. Notiser 1952: 247 (1952). Description: Bungartz et al. 2007. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – *Buellia griseovirens* is a sorediate species that is predominately montane in California, occurring in the Sierra Nevada Mountains as well as the mountain ranges of southern California. In CINP it is known from a single collection made on wood on the west end of the Central Valley of Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, pine forest, on wood, *Nash 32303* (ASU; det. Tønsberg).

Buellia halonia (Ach.) Tuck., Lich. Calif.: 26 (1866). Description: Bungartz et al. 2007. Substrate: non-calcareous rock. World distribution: Africa, North and South America. CINP distribution: SB, SC, SM, SR, WA.

PLATE 2, FIG. F.

NOTES. – *Buellia halonia* is common along the coast of California and Mexico. It occurs on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Miguel Island, west of Green Mountain, *Bratt 9009* (SBBG; det. Bungartz).

Buellia maritima (A. Massal.) Bagl. *in* Massal., Schedul. Critic. 8: 150 (1856). Description: Bungartz et al. 2007. Substrate: calcareous and non-calcareous rock. World distribution: Africa, Europe, North America. CINP distribution: SC, SM. SR.

PLATE 3, FIG. A.

NOTES. – *Buellia maritima* is common along the California coast. It is common on San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Miguel Island, Willow Canyon, on rock, *Knudsen 6957* (UCR).

Buellia oidalea (Tuck.) Tuck., Lich. Calif.: 26 (1866). Description: Bungartz et al. 2007. Substrate: bark and wood. World distribution: North America. CINP distribution: SC, SM, SR, WA.

PLATE 3, FIG. B.

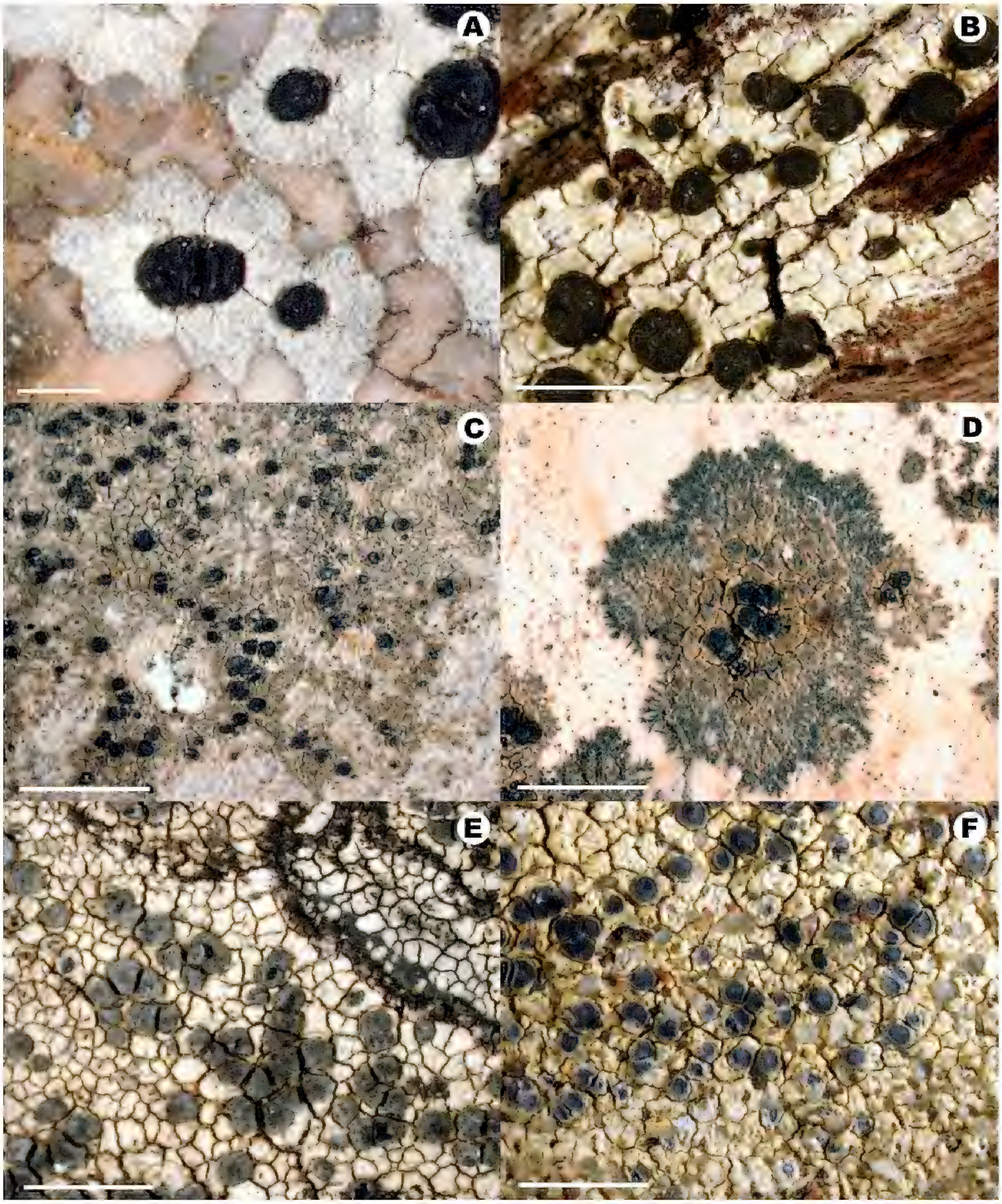

Plate 3, A, *Buellia maritima* (*Knudsen 6784*, UCR). B, *B. oidalea* (*Knudsen 7817*, UCR). C, *B. pullata* (*Nash 32672*, UCR). D, *B. ryanii* (*Knudsen 8541*, UCR). E, *B. tesserata* (*Nash 32176*, UCR). F, *Diplotomma venustum* (*Knudsen 10479*, UCR). Scales = 1.0 mm in B, D, E and F; 0.5 mm in A, C

NOTES. – *Buellia oidalea* is endemic to western North America and grows along the coast from Coos County in Oregon south to Baja California Sur in Mexico. *Buellia muriformis* A. Nordin also occurs along coast north of San Francisco and has atranorin its thallus (K+ strong yellow) instead of diploicin as well as smaller submuriform ascospores. That species might also occur on the Channel Islands but has not yet been found in the study area. *Buellia oidalea* is common on West Anacapa, San Miguel, Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, southeast side of Green Mountain, on redwood fence post, *Nash 41366* (ASU; det. Nordin).

Buellia prospersa (Nyl.) Riddle, Brookl. Bot. Gard. Mem. 1: 114 (1918). Substrate: silicate rock. Description: Bungartz et al. 2007. World distribution: probably cosmopolitan. CINP distribution: SM, SR, WA.

NOTES. – *Buellia prospersa* is rare along the California coast. It looks vaguely similar to *B. maritima* but is usually UV+ orange from xanthones if the thallus is not too thin. It occurs on West Anacapa, San Miguel, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, lower part of Willow Canyon, on rock, *Nash 41312* (ASU; det. Bungartz).

Buellia pullata Tuck., Lich. Californ.: 26 (1866). Substrate: non-calcareous rock. Description: Bungartz et al. 2007. World distribution: North America. CINP distribution: AN, SC, SM, SR.

PLATE 3, FIG. C.

NOTES. – *Buellia pullata* is common along the California coast. On the Channel Islands it can be confused with *B. christophii* which differs in having ascospores without ornamentation and a different ontogeny. The ornamentation of the ascospores of *B. pullata* is evident from early development. It is frequent on Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Fraser Point, on rock, *Tucker 35711* (SBBG; det. Bungartz).

Buellia ryanii Bungartz**,** Canad. J. Bot. 82: 548 (2004). Description: Bungartz et al. 2007. Substrate: non-calcareous rock, especially on small pebbles. World distribution: North America. CINP distribution: SC, SM, SR.

PLATE 3, FIG. D.

NOTES. – *Buellia ryanii* occurs at scattered locations in southern California like the northwestern Santa Ana Mountains where it is found on rounded granite pebbles washed out of sandstone. It was originally described from Santa Cruz Island. It is frequent on San Miguel, Santa Cruz, and Santa Rosa Islands, usually occurring on small stones.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, 4.5 km E of radar station , *Nash 31621* (ASU, det. Bungartz).

Buellia sequax (Nyl.) Zahlbr., Cat. Lich. Univ. 7: 410 (1931) emend Giralt, Bungartz & Elix, Mycolog. Prog. 10: 116 (2011). Description: Bungartz et al. 2007 (as *B. lepidastroidea*). Substrate: non-calcareous rock. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – *Buellia sequax* is infrequent along the coast of western North America from Washington south to Baja California. It is distinguished by its areolate to bullate or subsquamulose thallus, inspersed hymenium, and the production of atranorin and diploicin. The name *Buellia sequax* was misapplied to *B. abstracta*. It is only known from Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on rock, *Knudsen 11440 & Chaney* (UCR).

Buellia stellulata (Taylor) Mudd., Man. Brit. Lich.: 216 (1861). Description: Bungartz et al. 2007. Substrate: non-calcareous rocks. World distribution: Asia, Europe, North America. CINP distribution: AN, SC, SR.

NOTES. – *Buellia stellulata* is common along the coast of central California. A record from Santa Barbara Island collected by Charis Bratt at SBBG and determined by W.A. Weber needs to be verified. It frequent on Anacapa, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on rock, *Ryan 31283-A* (ASU; det. Bungartz).

Buellia tesserata Körber, Parerg. Lich.: 189 (1860). Description: Bungartz et al. 2007. Substrate: non-calcareous rock. World distribution: Africa, Europe, North America. CINP distribution: SB, SC, SM, SR.

PLATE 3, FIG. E.

NOTES. – *Buellia tesserata* is common along the coast of California and is easily recognized by its spidery black margin and white areolate thallus which lacks both norstictic acid and xanthones (UV-). It is frequent on San Miguel, Santa Barbara, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on rock, *Ryan 31282-B* (ASU; det. Bungartz).

Buelliella inops (Triebel & Rambold) Hafellner, Mycotaxon 84: 298 (2002). Description: Hafellner 2004a. Substrate: *Caloplaca* species on rock. World distribution: Australia, North America. CINP distribution: SB.

NOTES. – The lichenicolous fungus *Buelliella inops* is rare in southern California. It occurs on *Caloplaca bolacina* in CINP (Santa Barbara Island only) and in the Santa Monica Mountains.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Barbara Island, on *Caloplaca bolacina*, *Bratt 5141* (SBBG; det. Ertz).

Buelliella physciicola Poelt & Hafellner *in* Hafellner, Beih. Nova Hedwigia 62: 155 (1979). Description: Hafellner 2004a. Substrate: *Phaeophyscia* species. World distribution: Australia, North America. CINP distribution: SC, SR.

NOTES. – The lichenicolous fungus *Buelliella physciicola* is probably frequent in California. It occurs on Santa Cruz and Santa Rosa Islands.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Sierra Pablo Ridge, on *Phaeophyscia hirsuta*, *Nash 32836* (ASU; det. Hafellner)

Calicium abietinum Pers., Tent. Disp. Meth. Fung. 59 (1797). Description: Tibell and Ryan 2004a. Substrate: wood and bark of oaks and conifers, and on decaying logs and stumps in sunlight. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – *Calicium abietinum* is frequent in California. The species is locally common in the Los Osos area of San Luis Obispo County. It is currently known in CINP from a single collection on Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, 4.5 km E of radar station, *Nash 32481* (SBBG; det. Tibell).

Calicium glaucellum Ach., Meth. Lich.: 97 (1803). Description: Tibell and Ryan 2004a. Substrate: wood of stumps, fallen conifer and hardwood trees, rarely on bark. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Calicium glaucellum* is common in California. In CINP it occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, on fallen Bishop Pine, *Kocourková s.n. & Knudsen* (UCR).

Caloplaca ammiospila (Wahlenb.) H. Olivier, Mem. Soc. Nat. Sci. Nat. Cherboug 37: 136 (1909). Description: Wetmore 2007. Substrate: on bryophytes (sometimes growing on the trunks of trees) and on detritus. World distribution: Europe, North America. CINP distribution: SC, SR.

NOTES. – *Caloplaca ammiospila* is apparently rare in California. In CINP it occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Black Mountains area, on *Quercus pacifica*, *Nash 32593* (UCR; det. Wetmore).

Caloplaca atroflava (Turner) Mong., Bull. Geogr. Bot. 32: 192 (1914). Description: Wetmore 2007. Substrate: non-calcareous rocks. World istribution: Europe, North America. CINP distribution: SC, SR.

NOTES. – *Caloplaca atroflava* is uncommon in California. It is infrequent on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Old Ranch Canyon, on rock, *Wetmore 73928* (ASU, MIN).

Caloplaca bolacina (Tuck.) Herre**,** Proc. Wash. Acad. Sci. 12: 233 (1910). Description: Wetmore 2007. Substrate: non-calcareous rocks. World distribution: North America. CINP distribution: EA, SB, SC, SM, SR, WA.

PLATE 4, FIG. A.

NOTES. – *Caloplaca bolacina* is endemic to the western coast of North America and especially common in central and southern California. The spidery lines of the parasite *Lichenostigma bolacinae* can frequently be seen on the areoles of *C. bolacina* populations from Santa Rosa Island. It is common on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island: hilltop of volcanic rock above St. Augustine Canyon near Sierra Pablo Road, *Knudsen 8822.1* (UCR).

Caloplaca brattiae W.A. Weber, Graphis Scripta 2: 168 (1910). Description: Wetmore 2007. Substrate: non-calcareous rocks. World distribution: North America. CINP distribution: SB, SC, SM, SR, WA.

NOTES. – *Caloplaca brattiae* is frequent along the central coast of California. It occurs on all the Channel Islands in CINP where it often grows with *C. impolita.*

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, Fraser Point, on rock, *Wetmore 74030* (ASU, MIN).

Caloplaca catalinae H. Magn., Bot. Notiser 1944: 71 (1944). Description: Wetmore 2007. Substrate: wood, bark. World distribution: North America (California endemic). CINP distribution: SC.

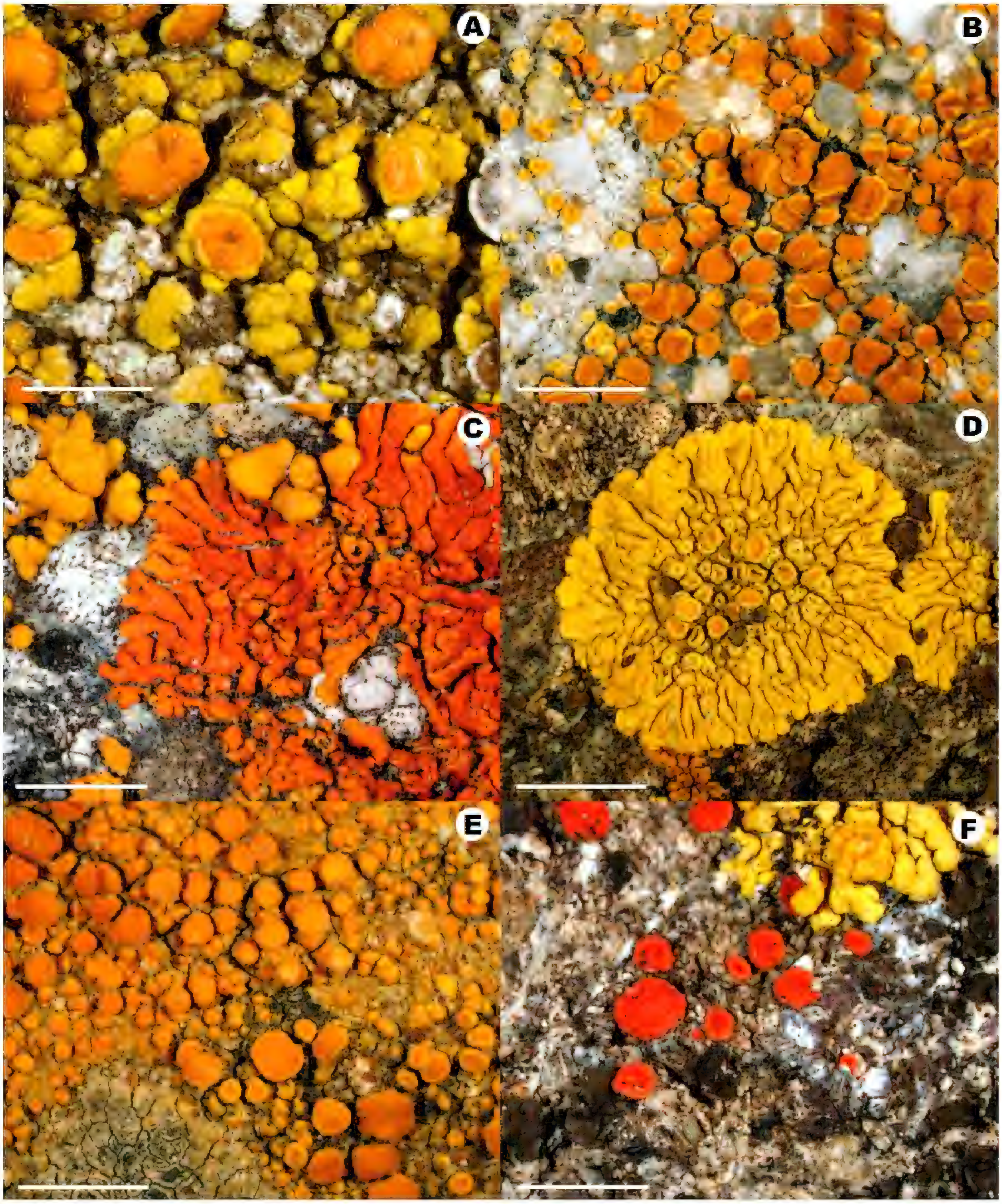

Plate 4, A, *Caloplaca bolacina* (*Knudsen 8877*, UCR). B, *C. crenulatella* (*Knudsen 14573*, UCR). C, *C. ignea* (*Knudsen 12026*, UCR). D, *C. impolita* (*Knudsen 12036*, UCR). E, *C. ludificans* (*Knudsen 11210*, UCR). F, *C. luteominia* var. *bolanderi* (*Knudsen 12037*, UCR). Scales = 2.0 mm in D; 1.0 mm in A-C, E and F.

NOTES. – *Caloplaca catalinae* is a rare California endemic known from the Channel Islands and the central California coast. It occurs on Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, west end of Central Valley, *Bratt 6485b* (ASU, SBBG; det. Wetmore).

Caloplaca cerina (Hedw.) Th. Fr., Lich. Arct.: 118 (1860). Description: Wetmore 2007. Substrate: bark. World distribution: cosmopolitan. CINP distribution: EA, SB, SC, SR.

NOTES. – *Caloplaca cerina* is common in California. In CINP it occurs on East Anacapa, Santa Barbara, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. VENTURA CO.: East Anacapa, on *Leptosyne gigantea, Knudsen 10777* (UCR).

Caloplaca citrina (Hoffm.) Th. Fr., Nova Acta Regiae Soc. Sci. Upsal. 3: 218 (1861). Description: Wetmore 2007. Substrate: bark, wood, bryophytes. World distribution: cosmopolitan. CINP distribution: SB, SC, SM, SR.

NOTES. – *Caloplaca citrina* is common in California including on the Channel Islands. As presently circumscribed however, it is is probably heterogeneous. The broad concept of Wetmore (2007) is used here but the specimens from the CINP need further study. It occurs on San Miguel, Santa Barbara, Santa Cruz, and Santa Rosa Islands in the study area.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Barbara Island, on rock, *Bratt 4878* (ASU; det. Wetmore) [this collection is mistakenly attributed to Wetmore in the ASU database].

Caloplaca coralloides (Tuck.) Hulting, Hedwigia 35: 187 (1896). Description: Wetmore 2007. Substrate: rocks in salt spray zone. World distribution: North America. CINP distribution: SB, SC, SM, SR, WA.

NOTES. – *Caloplaca coralloides* grows on coastal rocks in the salt spray zone. It is common along the California coast and occurs on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, mouth of Lobo Canyon, on rock, *Knudsen et al. 11376.2* (UCR).

Caloplaca crenulatella (Nyl.) H. Olivier, Mem. Soc. Nat. Sci. Nat. Cherbourg 37: 110 (1909). Description: Wetmore 2007. Substrate: calcareous rock, concrete, or usually in southern California on drainages and seeps on non-calcareous rocks. World distribution: Europe, New Zealand, North America. CINP distribution: SM, SR.

PLATE 4, FIG. B.

NOTES. – *Caloplaca crenulatella* is a calciphile, which can grow on concrete, but also grows on decaying silicate rock in drainages and seeps. It is common in California. In CINP it occurs on San Miguel and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Sandy Point, on caliche, *Wetmore 73642* (MIN).

Caloplaca durietzii H. Magn., Bot. Notiser 1953: 188 (1953). Description: Wetmore 2007. Substrate: bark or wood, especially junipers in Mojave Desert. World distribution: North America. CINP distribution: SC.

NOTES. – *Caloplaca durietzii* is separated from *C. pyracea* (Ach.) Zwackh based on its yellow-orange areolate thallus. The taxon is in need of further study and the species concept needs revision. It is common in the Mojave Desert on old junipers and has been identified from scattered locations in California by C.M. Wetmore (e.g., Banning Pass, the Granite Mountains, Joshua Tree National Park, the San Jacinto Mountains, and the Santa Monica Mountains from a historic Hasse collection). It was determined by Wetmore as occurring on Santa Cruz Island on oak.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, 4.5 km E of radar station, on oak bark, *Ryan 32481* (ASU; det. Wetmore).

Caloplaca ferruginea (Hudson) Th. Fr., Nova Acta Reg. Soc. Sci. Ups. 3: 223 (1861). Description: Wetmore 2007. Substrate: wood or bark. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Caloplaca ferruginea* is frequent in California. It can be confused with *C. catalinae* which has smaller ascospores and also occurs on Santa Cruz Island. The species is frequent on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, slope of Black Mountain, on bark, *Wetmore 73554* (MIN).

Caloplaca ignea Arup, Bryologist 98: 98 (1995). Description: Wetmore 2007. Substrate: calcareous or non-calcareous rocks. World distribution: North America. CINP distribution: SC, SM, SR.

PLATE 4, FIG. C.

NOTES. – *Caloplaca ignea* is a beautiful reddish lichen with long lobes that is fantastic to see in the noonday sun covering a dark boulder. It is separated from *C. biatorina* (A. Massal.) J. Steiner mainly by ascospore size and shape (Gayee 2009). Some older identifications from the islands may prove to be *C. biatorina* because both species occur in the adjacent Santa Monica Mountains on the mainland. *Caloplaca ignea* occurs on San Miguel, Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Black Mountain area, on rock, *Nash 32648-b* (ASU; det. Wetmore).

Caloplaca impolita Arup, Bryologist 98: 101 (1995). Description: Wetmore 2007. Substrate: non-calcareous rocks, serpentine. World distribution: North America. CINP distribution: EA, SB, SC, SR, WA.

PLATE 4, FIG. D.

NOTES. – The coastal species *Caloplaca impolita* is frequent along the southern and central California coast. It can be confused with *C. brattiae,* with which it is sympatric, but it is easily distinguished by the broader lobe tips that are yellow due to a fine pruina. It is the more common of the two species and is common on all of the Channel Islands where it is often found growing associated with *Niebla* species and *C. brattiae.*

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, slope of bluff above Lobo Canyon, *Knudsen 10570.2* (UCR).

Caloplaca ludificans Arup, Bryologist 98: 107 (1995). Description: Substrate: calcareous and non-calcareous rocks, serpentine. World distribution: North America. CINP distribution: EA, SB, SC, SM, SR, WA.

PLATE 4, FIG. E.

NOTES. – *Caloplaca ludificans* is a common coastal species in southern California and Mexico. It was originally described from the tip of Point Dume in the Santa Monica Mountains and is common on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, bluff between Soledad and Arlington Canyon near Gulch benchmark, *Knudsen 8943.2* (NY, UCR).

Caloplaca luteominia (Tuck.) Zahlbr**.,** Cat. Lich. Univ. 7: 156 (1930). Description: Wetmore 2007. Substrate: calcareous and non-calcareous rock, serpentine, occasionally on soil. World distribution: North America. CINP distribution: EA, SB, SC, SM, SR, WA.

PLATE 5, FIG. A.

NOTES. – *Caloplaca luteominia* is a common species along the coast of southern and central California. It can occur in the salt spray zone and also grows on soil in biological soil crusts. On the central coast of California it is often infected by the lichenicolous fungus *Opegrapha hellespontica* Vondrák & Kocourk. when occurring in the salt spray zone (Kocourková et al. 2012). The species is common on all of the islands in the study area. *Caloplaca subpyraceella* Nyl. *ex* Hasse is a terricolous species described from the Santa Monica Mountains in a biological soil crust and has been confused with *C. luteominia* (Wetmore 2007). It has especially a darker reddish hue than *C. luteominia* as well as thinner margin, is a member of the *crenulatella* group, and is expected on the Channel Islands (U. Arup, pers. comm.)

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Ford Point, on rock, *Knudsen et al. 10492* (UCR).

Caloplaca luteominia var. ***bolanderi*** (Tuck.) Arup, Bryologist 96: 469 (1993). Description: Wetmore 2007. Substrate: calcareous and non-calcareous rocks, serpentine. World distribution: North America. CINP distribution: SB, SM, SR, WA.

PLATE 4, FIG. F.

NOTES. – *Caloplaca luteominia* var. *bolanderi* is infrequent along the coast of western North America. It has distinctive reddish apothecia and is particularly beautiful when growing on greenish serpentine in Cayucos along the coast of central California. It is rare on West Anacapa, San Miguel, Santa Barbara, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, close to radar station, top of ridge just before main paved road, *Marsh 6765* (ASU; det. Esslinger).

Caloplaca marina ssp. ***americana*** Arup, Bryologist 95: 158 (1992). Description: Wetmore 2007. Substrate: non-calcareous rocks. World distribution: North America. CINP distribution: SC, SM.

NOTES. – *Caloplaca marina* ssp. *americana* has a scattered distribution along the coast of western North America and is probably undercollected or misidentified. It is apparently rare on the north Channel Islands and is known only from San Miguel and Santa Cruz Islands.

Selected voucher. **– U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, *Arup L89151* (LD).

Caloplaca marmorata (Bagl.) Jatta, Syl. Lich. Ital.: 251 (1900). Description: Wetmore 2007. Substrate: calcareous rocks. World distribution: Europe, North America. CINP distribution: SM, SR.

NOTES. – *Caloplaca marmorata* is known in California only from the Channel Islands, where it is usually found on caliche. It occurs on San Miguel and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, ridge of first marine terrace near road to China Camp, on exposed caliche, *Knudsen et al. 7821.1* (UCR).

Caloplaca microphyllina (Tuck.) Hasse, Contrib. U.S. Nat. Herb. 17: 114 (1913). Description: Wetmore 2007. Substrate: bark, wood, including fences. World distribution: Africa, Europe, North America. CINP distribution: SC.

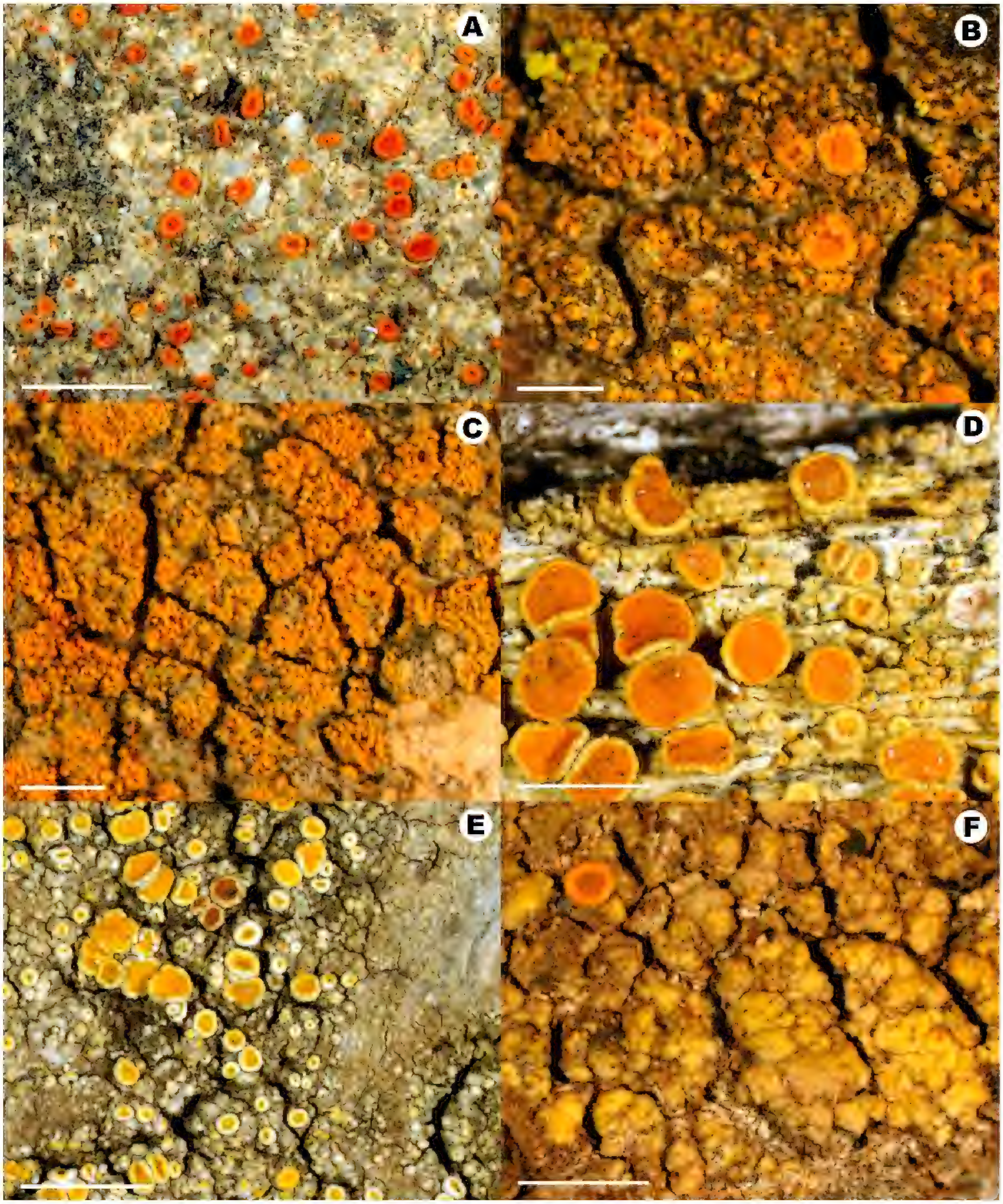

Plate 5, A, *Caloplaca luteominia* var. *luteominia* (*Knudsen 10492*, UCR). B, *C. microphyllina* (*Lendemer 14751A*, NY). C, *C. obamae* (*Knudsen 10572*, UCR). D, *C. stipitata* (*Wetmore 73651*, NY). E, *C. stanfordensis* (*Knudsen 10048*, UCR). F, *C. stantonii* (*Weber s.n.* in *Lichenes Exs. COLO 672*, NY). Scales = 1.0 mm in A, D-F; 0.5 m in B and C.

PLATE 5, FIG. B.

NOTES. – *Caloplaca microphyllina* has a scattered distribution in California and may be among those species disappearing with the increase in fire frequency. It is infrequent on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Christy Ranch, on wood, *Wetmore 74073* (MIN)

Caloplaca nashii Nav.-Ros., Gaya & Hladun**,** Mycotaxon 79: 31 (2001). Description: Wetmore 2007. Substrate: calcareous and non-calcareous rock (especially in drainage and seeps), concrete. World distribution: North America. CINP distribution: SR.

NOTES. – The two calciphiles *Caloplaca nashii* and *C. crenulatella* often occur in drainages or seasonal seeps on non-calcareous rock in California, sometimes together. Both species are endolithic, common, and even grow on concrete. *Caloplaca nashii* has larger ascospores than *C. crenulatella.* In CINP it is currently only known from Sandy Point on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Sandy Point, *Nash 32680* (ASU; det. Wetmore).

Caloplaca obamae K. Knudsen, Opuscula Philolichenum 6: 37 (2009). Description: Knudsen 2009. Substrate: soil. World distribution: North America (California endemic). CINP distribution: SR.

PLATE 5, FIG. C.

NOTES. – *Caloplaca obamae* is identified by its small granules, rhizohyphae, and growth on soil. It is endemic to Santa Rosa Island, growing on marine terraces of fine Pleistocene soils and forming biological soil crusts on flat surfaces. The species is a hardy pioneer, having survived grazing and disturbance by sheep, cattle, as well as herds of elk and deer introduced for hunting. We expect it to become common on Santa Rosa Island in the next hundred years as the island recovers from grazing. Unpublished molecular work shows that *Caloplaca obamae* is most closely related to several undescribed taxa from South America and Africa (Arup, pers. comm.). The lichen was named for President Obama in recognition of his support of science and research.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Soledad Canyon, on soil, *Knudsen et al. 10545* (UCR).

Caloplaca peliophylla (Tuck.) Zahlbr., Cat. Lich. Univ. 7: 262 (1931). Description: Wetmore 2007. Substrate: non-calcareous rocks, rarely soil. World distribution: North America. CINP distribution: SR.

NOTES. – *Caloplaca peliophylla* is apparently rare in California. It is grows on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Soledad Canyon, on soil, *Wetmore 73749* (MIN).

Caloplaca pyracea (Ach.) Zwackh, Flora 45: 487 (1862). Description: Arup 2009. Substrate: bark. World distribution: cosmopolitan. CINP distribution: EA, SB, SC, SM, SR.

NOTES. – *Caloplaca pyracea* is common throughout California. Until recently, North America specimens on trees were identified *C. holocarpa* (Hoffm. *ex* Ach.) A. E. Wade, but that name is now applied only to a taxon on rocks (Arup 2009) which has not been reported yet from California. *Caloplaca pyracea* occurs on all of the Channel Islands but is not dominant.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: East Anacapa Island, on dead twigs of *Baccharis*, *Knudsen 5293* (UCR).

Caloplaca rosei Hasse, Bryologist 14: 102 (1911). Description: Wetmore 2007. Substrate: calcareous and non-calcareous rock. World distribution: North America. CINP distribution: SB, SC, SM, SR, WA.

NOTES. – *Caloplaca rosei* occurs along the coast of western North America usually at elevations less than ten meters above sea level, but can occur at higher elevations on the Channel Islands. It occurs on all the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Fraser Point, *Arup L89153* (LD).

Caloplaca saxicola (Hoffm.) Nordin, *Caloplaca* sect. *Gasparrinia* i Nordeuropa: 87 (1972). Description: Wetmore 2007. Substrate: calcareous and non-calcareous rocks. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES**.** – *Caloplaca saxicola* is common in California but is rare on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, 4.5 km east of navy radar station, *Wetmore 74100* (ASU).

Caloplaca stanfordensis H. Magn., Bot. Notiser 1944: 67 (1944). Description: Wetmore 2007. Substrate: bark and wood, usually oaks, and collected on bone and caliche on Santa Rosa Island. World distribution: North America. CINP distribution: EA, SC, SM, SR, WA.

PLATE 5, FIG. E.

NOTES.– *Caloplaca stanfordensis* is frequent in southern and central California. It occurs on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Sandy Point, on caliche, *Ryan 31030* (ASU, UCR; det. Wetmore).

Caloplaca stantonii W.A. Weber *ex* Arup, Bryologist 95: 454 (1992). Description: Wetmore 2007. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SB, SC, SM, SR, WA.

PLATE 5, FIG. F.

NOTES. – *Caloplaca stantonii* is another beautiful species of *Caloplaca* that is easily identified by its squamulose orange thallus and dark brownish orange apothecia. It is relatively rare along the coast of western North America, but is common on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, *Knudsen 11868* (UCR).

Caloplaca stellata Wetmore & Kärnefelt, Bryologist 101: 246 (1998). Description: Wetmore 2007. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SR.

NOTES. – *Caloplaca stellata* is sorediate and has distinctive short lobes with marginal soralia. It is known from scattered locations in California, where it is most frequent above 4000 feet. In CINP it is only known from South Point on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on rock, *Wetmore 73910* (ASU, MIN).

Caloplaca stipitata Wetmore, Bryologist 102: 102 (1999). Description: Wetmore 2007. Substrate: bark. World distribution: North America. CINP distribution: SB, SC, SM, SR.

PLATE 5, FIG. D.

NOTES. – *Caloplaca stipitata* is easily recognized by its yellowish-orange areoles and its large stipitate apothecia. The Channel Islands are at the northern limit of the range of *C. stipitata, w*hich is especially common along the coast of Baja California. It often grows on weathered wood fences and posts. The species was described from San Rosa Island and is common on that island as well as San Miguel, Santa Barbara, and Santa Cruz Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Miguel Island, Cuyler Harbor, on old driftwood high above the beach, *Knudsen 6893* (UCR).

Caloplaca subsoluta (Nyl.) Zalhbr., Cat. Lich. Univ. 7: 185 (1931). Description: Wetmore 2007. Substrate: calcareous or non-calcareous rocks. World distribution: cosmopolitan. CINP distribution: SB, SC.

NOTES. – *Caloplaca subsoluta* is a common in California, but is rare on the Channel Islands. It occurs on Santa Barbara and Santa Cruz Islands in CINP

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, west end, near the trailer barranca, on rock, *Bratt 4998* (ASU, SBBG; det. Wetmore).

Candelaria pacifica M. Westb. & Arup, Biblioth. Lichenol. 106: 358 (2011). Description: Westberg and Arup 2011. Substrate: bark, wood, on rock (usually under population on phorophytes). World distribution: Europe, North and South America. CINP distribution: SC, SR.

PLATE 6, FIG. A.

NOTES. – The yellow sorediate *Candelaria pacifica* is distinguished by its 8-spored asci from the polysporous *C. concolor* (Dicks) Stein. For notes on the differences in thallus morphology between the two species see Westberg and Arup (2011). Apothecia are infrequent but not impossible to find. The species is frequent along the coast of western North America and can grow on non-native trees. In the past, California specimens were often reported as *C. concolor* and reports of this species from the Channel Islands need to be revised. Here we do not currently recognize *C. concolor* as occurring on the Channel Islands. In the study area *C. pacifica* occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Ranch, on bark of *Eucalyptus, Knudsen 8975.1* (UCR).

Candelariella aurella (Hoffm.) Zahlbr., Cat. Lich. Univ. 5: 790 (1928). Description: Westberg 2004. Substrate: limestone, concrete, non-calcareous rock especially in drainages and seeps, rarely on bark or wood. World distribution: cosmopolitan. CINP distribution: SM, SR.

PLATE 6, FIG. B.

NOTES. – *Candelariella aurella* occurs throughout California and is common on concrete. It often occurs with *Caloplaca nashii* or *C. crenulatella*. In CINP it occurs on San Miguel and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, sandy Point, on caliche*, Knudsen et al. 8789* (UCR).

Candelariella lutella (Vainio) Räsänen, Ann. Soc. Zool. Bot. Fenn. "Vanamo" 12: 57 (1939). Description: Westberg 2004. Substrate: bark. World distribution: probably circumpolar. CINP distribution: SR.

NOTES. – *Candelariella lutella* appears to be frequent in central and northern California, particularly in the Sierra Nevada Mountains, and is probably undercollected. It apparently needs habitats with fairly high relative annual humidity. Within CINP it is known from a single collection from Santa Rosa Island.

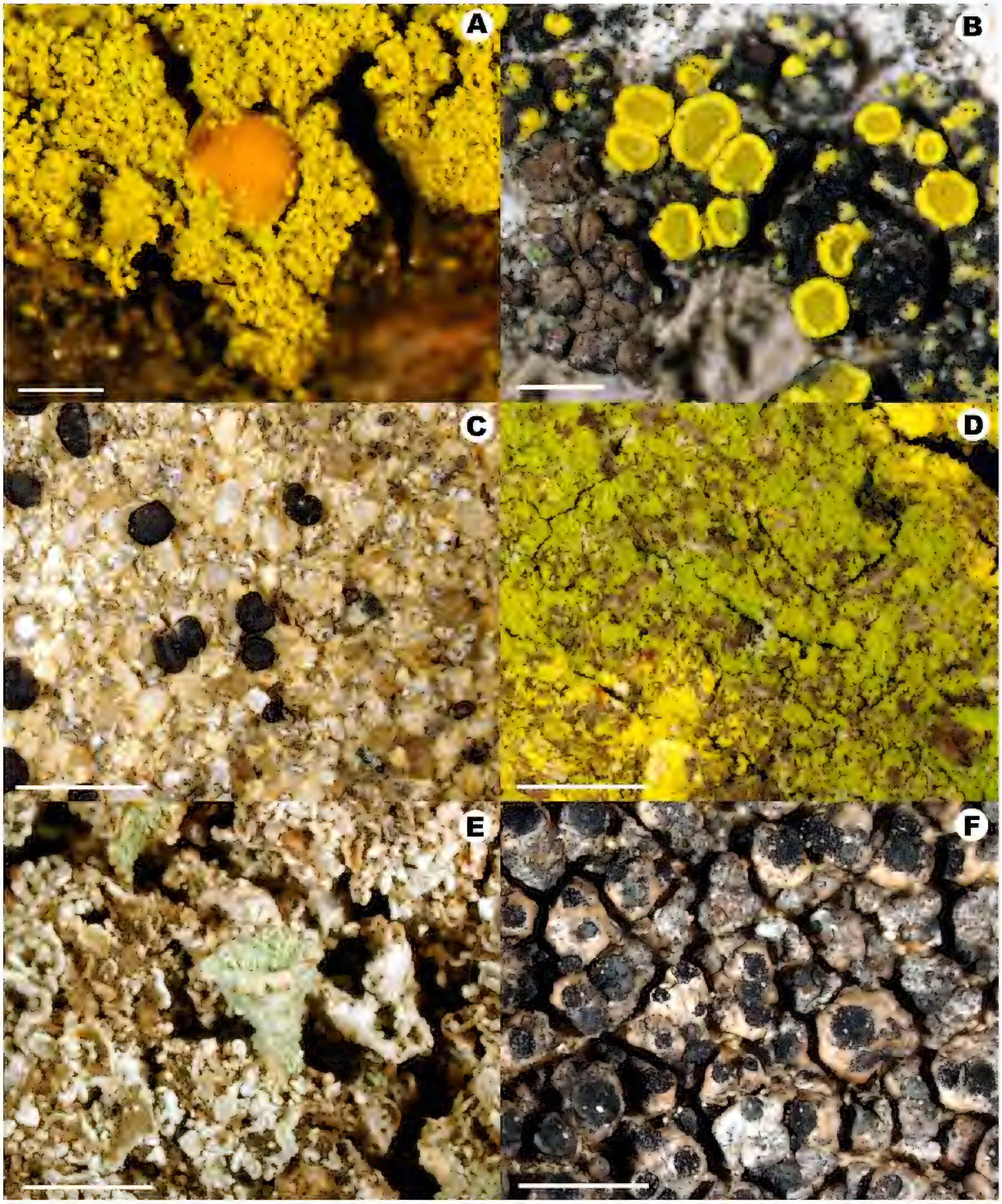

Plate 6, A, *Candelaria pacifica* (*Knudsen 3437*, UCR). B, *Candelariella vitellina* (*Lendemer 14883A*, NY). C, *Catillaria lenticularis* (*Knudsen 4882*, UCR). D, *Chrysothrix xanthina* (*Knudsen 12190*, UCR). E, *Cladonia nashii* (*Knudsen 6437*, UCR). F, *Cyphelium brunneum* (*Knudsen 11408*, UCR). Scales = 1.0 mm in C-F; 0.5 mm in A, B.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Burma Road, on dusty old wood of *Quercus tomemtella, Knudsen 8708 & Kocourková* (UCR).

Candelariella vitellina (Hoffm.) Müll. Arg., Bull. Herb. Herb. Boissier 2: 47 (1894). Description: Westberg 2004. Substrate: non-calcareous rock, rarely on bark and wood. World distribution: Europe, North America. CINP distribution: SC, SM, SR, WA.

NOTES. – *Candelariella vitellina* is common on silicate rock in California, especially in montane habitats. It is distinguished from *C. aurella* by its asci that contain 16–24 ascospores. The species is frequent on the Channel Islands, occurring on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, *Knudsen 10602 & Chaney* (UCR).

Candelariella xanthostigma (Ach.) Lettau, Hedwigia 52: 196 (1810). Description: Westberg 2004. Substrate: bark and wood of a variety of phorophytes, often common on *Leptosyne gigantea*. World distribution: cosmopolitan. CINP distribution: EA, SC, SM, SR.

NOTES. – *Candelariella xanthostigma* is apparently only common in California on the Channel Islands. It occurs on East Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: East Anacapa Island, on *Leptosyne gigantea, Knudsen 10919.2* (UCR).

Carbonea latypizodes (Nyl.) Knoph & Rambold, Lichen Flora of the Greater Sonoran Desert Region 2: 55 (2004). Description: Knoph et al. 2004; Knudsen et al. 2008. Substrate: non-calcareous rocks, especially sandstone, often on pebbles, rarely on soil in biological soil crusts. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – *Carbonea latypizodes* occurs in California in the southern part of the state where it appears to be infrequent, being locally abundant only on sandstone in the northwest Santa Ana Mountains. It was first collected in the state by H.E. Hasse with *Acarospora obpallens* and *Caloplaca subpyraceella* in a biological soil crust in Santa Monica and was described as *Lecidea subplebeia* Nyl. *ex* Hasse which is a synonym (Hasse 1913, Knudsen et al. 2008). In CINP the species is only known from a single collection made on Santa Cruz Island where it was growing on soil and small pebbles.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, ridge south of Canada Cervida above Christi Ranch, *Knudsen et al. 8573* (UCR).

Catillaria chalybeia (Borrer) A. Massal., Ric. Auton. Lich. Crost.: 79 (1852). Description: Hertel et al. 2007. Substrate: non-calcareous rock. World distribution: Africa, Europe, North and South America. CINP distribution: SR.

NOTES. – *Catillaria chalybeia* is a coastal species in California, often lacking any visible thallus. In CINP it is only known from a single collection from Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, end of Lobo Canyon, on sandstone, *Knudsen 10221* (UCR).

Catillaria lenticularis (Ach.) Th. Fr., Lich. Scand.: 567 (1864). Description: Hertel et al. 2007. Substrate: calcareous and non-calcareous rock. World distribution: Europe, North America. CINP distribution: SR.

PLATE 6, FIG. C.

NOTES. – *Catillaria lenticularis* is more common along the California coast than *C. chalybeia* and prefers more calcareous substrates. In CINP it is only known from a single collection from Santa Rosa Island**.**

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Soledad, on soft shale, *Knudsen 11287* (UCR).

Catillaria nigroclavata (Nyl.) J. Steiner *in* Sitzenb. Math.-Nat. Cl. Kais. Akad. Wiss., Wien 107: 157. (1898). Description: Hertel et al. 2007. Substrate: bark, wood. World distribution: Europe, New Zealand, North America. CINP distribution: SM.

NOTES. – *Catillaria nigroclavata* is a rare coastal species in California, often lacking any visible thallus. In CINP it is only known from a single collection from Santa Miguel Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Miguel Island, Green Mountain, on old wood, *Knudsen 6778.2* (UCR; det. Ekman).

Catillaria subviridis (Nyl.) Zahlbr., Cat. Lich. Univ. 4: 75 (1926). Description: Hertel et al. 2007. Substrate: non-calcareous rock. World distribution: Europe, North America. CINP distribution: SC.

NOTES. – Verified occurences of *Catillaria subviridis* in California are known only from on Santa Cruz Island (Hertel et al. 2007).

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, *Knudsen 14882.1 & Kocourková* (UCR).

*****Cercidospora cladoniicola*** Alstrup, Graphis Scripta 8(1): 26 (1997). Description: Alstrup 1997; Lendemer et al. 2008. Substrate: *Cladonia* species. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – *Cercidospora cladoniicola* is lichenicolous on *Cladonia* species and is known in California from a single collection made on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, on *Cladonia* species, *Knudsen & Kocourková s.n.* (PRM 909679).

Chrysothrix granulosa G. Thor, Bryologist 91: 361 (1988). Description: Tønsberg 2004a. Substrate: bark and wood. World distribution: North and South America. CINP distribution: SC, SM, SR, WA.

NOTES. – *Chrysothrix granulosa* is common along the coast of California. It is easily identified by its thick stratified thallus with a yellow leprose surface and K+ orange-red reaction due to the presence of the exolite calycin. It is frequent on Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on bark, *Ryan 31332* (ASU; det. Tønsberg).

Chrysothrix xanthina (Vainio) Kalb, Biblioth. Lichenol. 78: 144 (2001). Description: Kukwa and Knudsen 2011. Substrate: bark, wood, wood fences, sometimes on rock, sometimes overgrowing saxicolous lichens. World distribution: cosmopolitan. CINP distribution: SC, SR.

PLATE 6, FIG. D.

NOTES. – *Chrysothrix xanthina* occurs throughout coastal and cismontane southern California and is expected throughout California and Oregon. In the past it has been identified as *C. candelaris* (L.) J.R. Laundon (Tønsberg 2004) which differs in having calycin instead of pinastric acid and very large granules. That species and is currently not known to occur in North America. When *C. xanthina* is beginning to colonize a new tree, it can form thick clots of granules that can be mistaken for *C. granulosa*, but *C. xanthina* is K-. Records of *C. candelaris* from the Channel Islands need to be revised. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on old Toyon tree, *Knudsen 11917* (UCR).

Cladonia chlorophaea (Flörke *ex* Sommerf.) Spreng., Syst. Veg. 4: 273 (1827). Description: Ahti and Hammer 2002. Substrate: soil, detritus, trunks of trees, spike moss, decorticate and rotting wood. World distribution: cosmopolitan. CINP distribution: SR, WA.

NOTES. – *Cladonia chlorophaea* is probably the most common species of the genus in California, but the name has often been misapplied. Reports of *Cladonia pyxidata* (L.) Hoffm. from CINP need to be verified. *Cladonia chlorophaea* is infrequent on West Anacapa and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Torrey Pine forest, on soft shale, *Knudsen 11287* (UCR).

Cladonia hammeri Ahti *in* Ahti & Hammer, Lichen Flora of the Greater Sonoran Desert Region 1: 144 (2002). Description: Ahti and Hammer 2002. Substrate: soil. World distribution: North America. CINP distribution: SR, WA.

NOTES. – *Cladonia hammeri* is endemic to the California Floristic Province and is widespread in southern California. It is easily confused with *C. nashii* Ahti (see the entry for that taxon below). The species is only known on the Channel Islands from West Anacapa and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on soil, *Nash 37107* (ASU; det. Ahti).

Cladonia macilenta Hoffm., Deutschl. Fl. 2: 126 (1796). Description: Ahti and Hammer 2002. Substrate: usually dead wood, occasionally on tree bases, rocks, and soil. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Cladonia macilenta* is frequent along the central and northern coast of California, usually occurring on dry weathered old wood. It is the only *Cladonia* species on the Channel Islands with red apothecia and is common on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Twin Faults, on wood, *Wetmore 73839* (MIN).

Cladonia maritima K. Knudsen & Lendemer, Opuscula Philolichenum 6: 122 (2009). Description: Knudsen and Lendemer 2009. Substrate: soil. World distribution: North America (California endemic). CINP distribution: SC, SR, WA.

NOTES. – *Cladonia maritima* is frequent in southern California, usually occurring near the coast. It was described from the Santa Ana Mountains in Riverside County. In the past, it was identified as *Cladonia cervicornis* (Ach.) Flot., which does not occur in California (Ahti 2007; Knudsen & Lendemer 2009). It is an indicator species of Casperian biological soil crusts on reconsolidated alluvium from sandstone (Hernandez & Knudsen 2012) and in CINP occurs on West Anacapa, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on soil, *Knudsen 10848* (UCR).

Cladonia nashii Ahti *in* Ahti & Hammer, Lichen Flora of the Greater Sonoran Desert Region 1: 148 (2002). Description: Ahti and Hammer 2002. Substrate: soil. World distribution: North America. CINP distribution: SM, SR.

PLATE 6, FIG. E.

NOTES. – *Cladonia nashii* is common in southern California, especially in the Santa Ana Mountains, where it often forms stable biological soil crusts on steep slopes of loose alluvium. It was originally described from Santa Rosa Island, where it is also common. The species is distinguished primarily from *C. hammeri* by the presence of atranorin. Unfortunately spot tests must be carefully done under a microscope and sometimes the atranorin can only be detected with thin-layer chromatography (about two or three of every ten specimens). Contrary to the published accounts *C. nashii* also can produce large granules like *C. hammeri,* which is supposed to be a morphological difference between the two species (Ahti and Hammer 2002). Within CINP *Cladonia nashii* occurs on San Miguel Island (a single population in Willow Canyon) and on West Anacapa, Santa Cruz, Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Twin Faults, on soil, *Knudsen et al. 7721* (H, UCR; verified by Ahti).

Cladonia scabriuscula (Delise) Nyl., Compt. Rend. Hebd. Séances Acad. Sci. Paris 83: 88 (1876). Description: Ahti and Hammer 2002. Substrate: detritus, soil. World distribution: cosmopolitan. CINP distribution: SC, SR, WA.

NOTES. – *Cladonia scabriuscula* is frequent in coastal California. It is often found growing on detritus in the chaparral and coastal sage shrub understory. It is occurs on West Anacapa, Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, summit of Black Mountain, on soil and moss in sun, *Knudsen 7385 & Baguskus* (UCR).

Cladonia subfimbriata Ahti in Ahti & Hammer, Lichen Flora of the Greater Sonoran Desert Region 1: 153 (2002). Description: Ahti and Hammer 2002. Substrate: soil. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Cladonia subfimbriata* is an impressive species when fully developed with proliferations from the cups. Southern California appears to be at the northern limit of its range on the west coast of North America, with its center of diversity being in central Mexico. In its early development before the cups widen, it can be confused with *C. subulata* (L.) F.H. Wigg. Scrappy specimens, especially from exposed sites, have been identified by S. Hammer from southern California as *Cladonia verruclosa* (Vain.) Ahti (ASU!, FH!), including all of the records of that taxon from California in Ahti and Hammer (2002). As such we do not recognize *C. verruclosa* as occurring in southern California. In CINP *C. subfimbriata* is rare on Santa Cruz and Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on soil in shade, *Knudsen 7844* (H, UCR; verified by Ahti).

Clavascidium lacinulatum (Ach.) Pietro ***in*** Pietro et al., Amer. Jour. Bot. 99: 28 (2012). Description: Breuss 2002b (as *Placidium lacinulatum*). Substrate: soil. World distribution: cosmopolitan. CINP distribution: SC, SR, WA.

PLATE 16, FIG. A.

NOTES. – *Clavascidium lacinulatum* is common in biological soil crusts throughout western North America. It has long rhizines and a rhizohyphal weft that binds and stabilizes the soil as in the species *Endocarpon pusillum.* It occurs on West Anacapa, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – U.S.A. CALIFORNIA. SANTA BARBARA CO.: Santa Rosa Island, Torrey Pine grove, on volcanic breccia, *Knudsen 7433* (UCR).

Cliostomum griffithii (Sm.) Coppins *in* D. Hawksw. et al., Lichenologist 12: 106 (1980). Description: Ekman 2004c. Substrate: bark, rarely on rock usually below phorophytes. World distribution: cosmopolitan. CINP distribution: SC, SM, SR, WA.

NOTES**.** – *Cliostomum griffithii* is common along the coast from Baja California to Point Lobos. It is common on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, isolated peak along road from Sierra Pablo to East Point, on bark, *Ryan 31149* (ASU).

Collema coccophorum Tuck., Proc. Am. Acad. Arts & Sci. 5: 385 (1862). Description: Schultz et al. 2004. Substrate: soil, soft sandstone. World distribution: cosmopolitan. CINP distribution: SC, SM, SR.

NOTES. – *Collema coccophorum* is common in biological soil crusts throughout California, though it is often sterile or easily overlooked. It is a pioneer species and is an indicator of the re-establishment of biological soil crusts in disturbed areas. The species is frequent on San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, Green Mountain, *Knudsen 6759* (UCR).

Collema crispum (Hudson) F. H. Wigg., Primit. Fl. Holsat.: 89 (1780). Description: Schultz et al. 2004. Substrate: soil, bryophytes, sometimes among filamentous cyanobacteria. World distribution: cosmopolitan. CINP distribution: SC, SR, WA.

NOTES. – *Collema crispum* is infrequent in California where it occurs in biological soil crusts on calcareous soil. It is likewiseinfrequent on West Anacapa, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, N-facing sedimentary outcrops just below Barton Point in grassland, *Nash 32783* (ASU; det. Schultz).

Collema cristatum (L.) F.H. Wigg., Primit. Fl. Holsat.: 89 (1780). Description: Schultz et al. 2004. Substrate: calcareous and noncalareous rock and soil. World distribution: Asia, Africa, Europe, North America. CINP distribution: SM, SR.

NOTES. – *Collema cristatum* usually occurs on rock or sand-filled crevices and is rare in California, known only from Ventura and Santa Barbara Counties. It is rare on the Channel Islands, only known from San Miguel and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, lower Willow Canyon, on rock, *Nash 41299* (ASU; det. Schultz).

Collema furfuraceum (Arnold) Du Rietz, Ark. Bot. 22A, 13: 3 (1929). Description: Schultz et al. 2004. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Collema furfuraceum* is common in California, especially in the mountains at higher elevations. It is common on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on *Quercus dumosa*, *Marsh 6956* (ASU; det. Schultz).

Collema nigrescens (Hudson) DC. *in* Lamarck & DC., Fl. Franç, ed. 3, 2: 384 (1805). Description: Schultz et al. 2004. Substrate: bark, rock. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Collema nigrescens* occurs along the coast of California, frequently on oaks. It is frequent on Santa Cruz Island and is infrequent on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Prisoners Harbor, on oak, *Wetmore 74152* (ASU, MIN; det. Schultz).

Collema tenax (Sw.) Ach., Lich. Univ.: 635 (1810). Description: Schultz et al. 2004. Substrate: soil, rarely rock. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – *Collema tenax* is frequent in California in a variety of habitats, but due to its polymorphic thallus must be identified by its muriform ascospores. In CINP it is known from a single collection from Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, on soil, *Printzen s.n.* (ASU; det. Schultz).

Collemopsidium sublitoralis (Leighton) Grube & B. D. Ryan, Lichen Flora of the Greater Sonoran Desert Region 1: 163 (2002). Description: Grube and Ryan 2002. Substrate: rock, barnacles, limpets. World distribution: Europe, New Zealand, North America. CINP distribution: SR.

NOTES. – *Collemopsidium sublitoralis* is the most common species in the genus along the southern and central California coast. In CINP it occurs on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Point Lobo, on rock, *Knudsen 11372* (UCR).

Cresponea chloroconia (Tuck.) Egea & Torrente, Mycotaxon 48: 310 (1993). Description: Egea et al. 2004b. Substrate: bark, wood. World distribution: Asia, Europe, North America. CINP distribution: SR.

NOTES. – *Cresponea chloroconia* is locally abundant along the central coast of California south to Baja California. It is only known from Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on *Quercus agrifolia*, *Nash 32948* (ASU; det. Egea & Torrente).

Cyphelium brunneum W.A. Weber, Bryologist 70: 199 (1967). Description: Tibell and Ryan 2004b. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SR.

PLATE 6, FIG. F.

NOTES. – *Cyphelium brunneum* is naturally rare, occurring along the coast of southern California and Baja California. The brown verrucae are conspicuous with their black mazadium. The largest population in southern California occurs on South Point on Santa Rosa Island. The rare species *C. brachysporum* Nádv., endemic to California, was identified by B.D. Ryan from Channel Islands but the specimen lacks any remaining apothecia. *Cyphelium brunneum* occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on rock, *Knudsen 11408 & Chaney* (UCR).

Dacampia lecaniae Kocourk. & K. Knudsen, Biblioth. Lichenol. 105: 34 (2010). Description: Kocourková and Knudsen 2010. Substrate: *Lecania fuscella.* World World distribution: North America (California endemic). CINP distribution: WA (endemic).

NOTES. – *Dacampia lecaniae* is parasitic on *Lecania fuscella* and is only known from the type collection on West Anacapa Island.

Voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on *Lecania fuscella*, *Knudsen 10800* (UCR).

Dactylospora pleiosperma Triebel *in* Hafellner et al., Mycotaxon 84: 300 (2002). Description: Hafellner 2004b. Substrate: *Lecanora caesiorubella* (norstictic acid chemotype). World distribution: North America (California endemic). CINP distribution: SC, SR.

NOTES. – *Dactylospora pleiosperma* is lichenicolous on *Lecanora caesiorubella* along the central and southern coast of California (Kocourková et al. 2012). In CINP it occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on *Lecanora caesiorubella*, *Kocourková 7056 & Knudsen* (NY).

Dactylospora saxatilis (Schaerer) Hafellner, Beih. Nova Hedwigia 62: 129 (1979). Description: Hafellner 2004b. Substrate: *Pertusaria* species. World distribution: Asia, Africa, North America. CINP distribution: SR.

NOTES. – *Dactylospora saxatilis* is lichenicolous on various *Pertusaria* species and is currently only known in the state from southern California where it is apparently rare (Kocourková et al. 2012). It occurs on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, hills above Beecher Bay, on *Pertusaria flavicunda, Knudsen 7496* (UCR).

Dendrographa alectoroides Sundin & Tehler, Bryologist 19: 26 (1996). Description: Tehler 2002a. Substrate: bark, wood, rock. World distribution: North America (California endemic). CINP distribution: SC, SR.

NOTES. – *Dendrographa alectoroides* is endemic to California where it is frequent from Monterey to Marin County along the coast. It reaches its southern distribution limit on San Clemente Island. Here we do not distinguish between fertile and non-fertile specimens using infraspecific categories. This species is rare in CINP where it is known only from Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Fraser Point, on rocks on shaded vertical cliff, *Sundin 1521* (SBBG).

Dendrographa leucophaea (Tuck.) Darb., Ber. Deutsch. Bot. Ges. 13: 321 (1895). Description: Tehler 2002a. Substrate: bark, wood, rocks. World distribution: North America. CINP distribution: EA, SB, SC, SM, SR, WA.

PLATE 7, FIG. A.

NOTES. – *Dendrographa leucophaea* is locally abundant along the coast of Baja California in Mexico north to Monterey County, where it is common on Point Lobos. We do not distinguish between fertile and non-fertile specimens using infraspecific categories. The lichenicolous fungi *Trimmatostroma dendrographae* Diederich, Ertz, U. Braun & Heuchert and *Lichenodiplis dendrographae* Diederich & van den Boom, occur on *D. leucophaea* along the central California coast (Kocourková et al. 2012). The species is common on all the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Barbara Island, west side of Cat Canyon, *Bratt 5201* (ASU; det. Tehler).

Dermatocarpon americanum Vainio, Dansk. Bot. Ark. 11: 25 (1926). Description: Heiömarsson and Breuss 2004. Substrate: calcareous and non-calcareous rock especially in drainages and seeps. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Dermatocarpon americanum* is common both throughout California and the Channel Islands. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

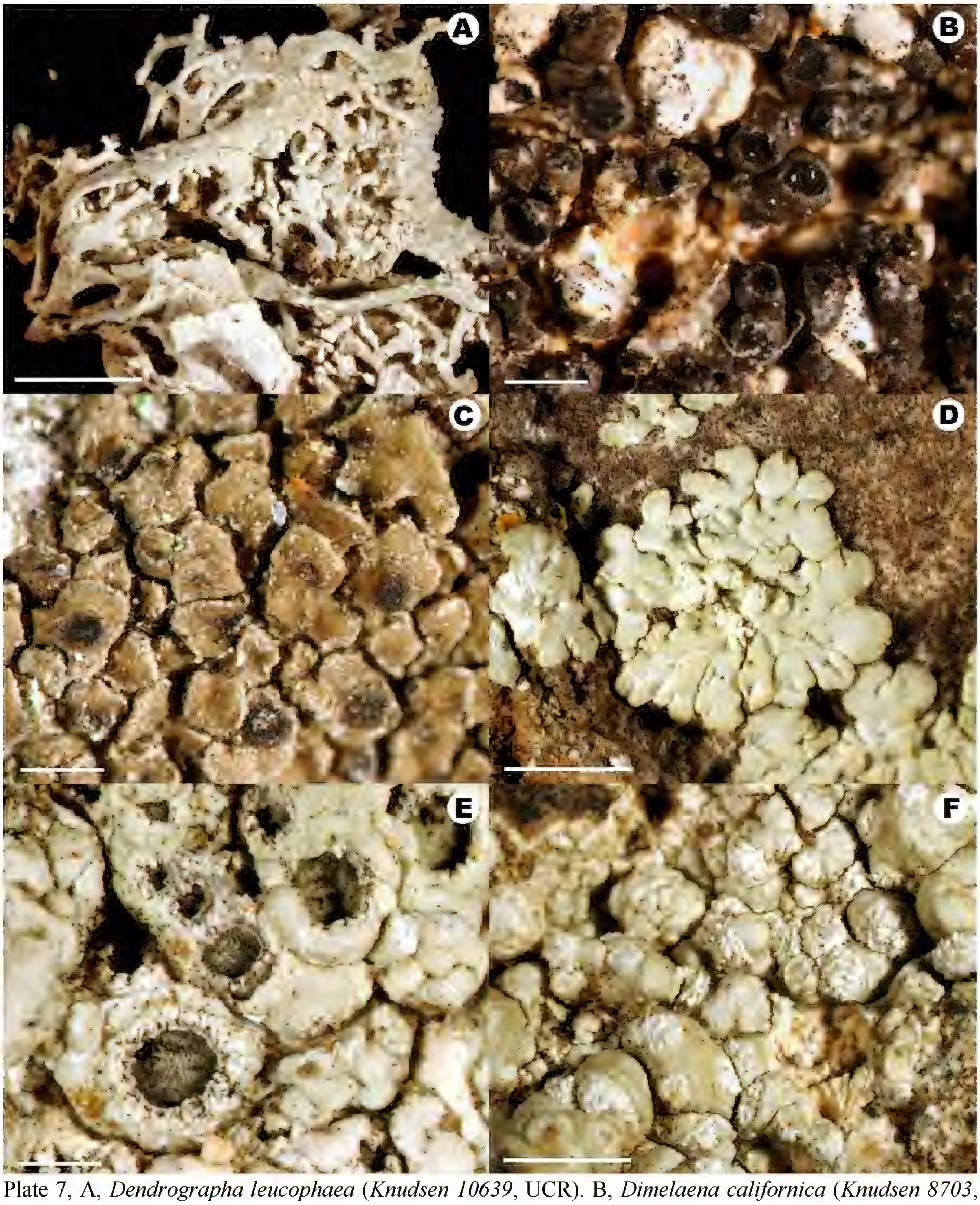

Plate 7, A, *Dendrographa leucophaea* (*Knudsen 10639*, UCR). B, *Dimelaena californica* (*Knudsen 8703*, UCR). C, *Dimelaena weberi* (*Knudsen 5143.2*, UCR). D, *Diploicia canescens* (*Knudsen 10919.1*, UCR). E, *Diploschistes muscorum* (*Knudsen 2676*, UCR). F, *Dirina catalinariae* (*Knudsen 10647*, UCR). Scales = 2.0 mm in A; 1.0 mm in D and F; 0.5 mm in B, C, E.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on rock, *Knudsen 8958* (UCR).

Dermatocarpon leptophyllodes (Nyl.) Zahlbr., Cat. Lich. Univ.: 30 (1922). Description: Heiömarsson and Breuss 2004. Substrate: calcareous and non-calcereous rocks in drainages and seeps. World distribution: Europe, North America. CINP distribution: SC.

NOTES. – *Dermatocarpon leptophyllodes* is rarely reported from California, but it is easily overlooked because of the small size of the squamules and its usual occurrence in small populations intermixed with other saxicolous lichens. It occurs on Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, in seasonal drainage on volcanic rock above Smuggler's Road, *Knudsen 15012 & Kocourková* (UCR).

Dimelaena californica (H. Magn.) Sheard, Bryologist 77: 131 (1974). Description: Mayrhofer and Sheard 2004. Substrate: juvenile parasite on *Dimelaena radiata* on non-calcareous rock, developing an independent lichenized thallus. Western distribution: North America. CINP distribution: SC, SM, SR, WA.

PLATE 7, FIG. B.

NOTES. – *Dimelaena californica* is rare along the coast of California. It is a juvenile parasite on *D. radiata* (Tuck.) Hale & Culb., eventually developing an independent brown lichenized thallus. It is frequent on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Fraser Point, on rock, *Sheard 5116c* (ASU).

Dimelaena radiata (Tuck.) Müll. Arg., Flora 67: 466 (1884). Description: Mayrhofer and Sheard 2004. Substrate: non-calcareous rock. World distribution: Africa, Europe, North America. CINP distribution: EA, SB, SC, SM, SR, WA.

NOTES. – *Dimelaena radiata* is a common along the California coast. In southern California in can rarely be found inland up to fifty miles. It is common on all the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.**:** East Anacapa, on basalt, *Knudsen 5322* (UCR).

Dimelaena weberi Sheard, Bryologist 87: 246 (1984). Description: Mayrhofer and Sheard 2004a. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SB, SC, SM.

PLATE 7, FIG. C.

NOTES. – *Dimelaena weberi* is a rare species that occurs on the central and southern California coast. It is often intermixed with other lichens as in the case of the illustration presented here. The species is rare on San Miguel, Santa Barbara, and Santa Cruz Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.**:** Santa Barbara Island, on rock, *Bratt 3666* (SBBG; det. Sheard).

Diploicia canescens (Dickson) A. Massal., Ric. Auton. Lich. Crost.: 86 (1852). Description: Kalb and Elix 2007. Substrate: bark, rock. World distribution: cosmopolitan. CINP distribution: EA, SB, SC, SM, SR, WA.

PLATE 7, FIG. D.

NOTES. – *Diploicia canescens* is common along the coast of southern and central California. It usually is found on bark, but can form beautiful effigurate specimens on rock. The species occurs on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, Green Mountain, *Knudsen 6750* (UCR).

Diploschistes actinostomus (Ach.) Zahlbr., Hedwigia 31: 34 (1892). Description: Lumbsch 2002. Substrate: non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SC, SR, WA.

NOTES. – *Diploschistes actinostomus* is frequent in southern and central California especially on sandstone. It is infrequent in CINP where it occurs on West Anacapa, Santa Cruz, and Santa Rosa Islands.

*Selected voucher***.** – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: West Anacapa Island, Summit Peak, on basalt, *Knudsen 10866.2* (UCR).

Diploschistes aeneus (Müll. Arg.) Lumbsch, J. Hattori Bot. Lab. 66: 158 (1989). Description: Lumbsch 2002. Substrate: non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Diploschistes aeneus* is only known in California from a single collection from South Point on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on rock, *Nash 33015* (ASU; det. Lumbsch).

Diploschistes diacapsis (Ach.) Lumbsch, Lichenologist 20: 20 (1988). Description: Lumbsch 2002. Substrate: soil. World distribution: cosmopolitan. CINP distribution: SC, SR, WA.

NOTES. – *Diploschistes diacapsis* is locally frequent near the coast in southern and central California and is especially well developed on sandy soils forming late-succession biological soil crusts. It is occurs on West Anacapa, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, flat ridge top between two forks of Cherry Canyon, on soil, *Knudsen 10629* (UCR).

Diploschistes muscorum (Scop.) R. Sant., Lichenologist 12: 106 (1980). Description: Lumbsch 2002. Substrate: *Cladonia* species, *Leprocaulon americanum, Lepraria xerophila,* soil, rarely sandstone and rock. World distribution: cosmopolitan. CINP distribution: SC, SM, SR, WA.

PLATE 7, FIG. E.

NOTES. – *Diploschistes muscorum* is common wherever *Cladonia* species grow in California because it is a juvenile parasite on thalli of those taxa. It is also a juvenile parasite on *Lepraria xerophila* and *Leprocaulon americanum* on the Channel Islands. Often large patches of *D. muscorum* are the only evidence that *Cladonia* species were once present at a site. It occurs on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on soil and *Lepraria xerophila*, *Knudsen 11908* (UCR).

Diploschistes scruposus (Schreber) Norman, Nyt. Mag. Naturvid. 7: 232 (1853). Description: Lumbsch 2002. Substrate: non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SB, SC, SR.

NOTES. – *Diploschistes scruposus* is frequent in California, particularly inland and in the mountains. There was a tendency among some collectors to identify *D. scruposus* based solely on its occurrence on rock, but *D. muscorum* often grows on *Cladonia* species on soil in crevices and spreads onto the adjoining rock. It looks similar to *D. muscorum* but is not pruinose and forms a flatter looking thallus. The species occurs on Santa Barbara, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, northwest fork of Windmill Canyon, on rock, *Knudsen 10450* (UCR).

Diplotomma alboatrum (Hoffm.) Flotow, Jahrber. Schles. Ges. Vaterl. Kult. 27: 130 (1849). Description: Bungartz et al. 2007 (as *Buellia alboatra*). Substrate: calcareous and non-calcareous rock. World World distribution: cosmopolitan. CINP distribution: SM, SR.

NOTES. – *Diplotomma alboatrum* is frequent, at least in southern California. Southern California specimens often lack norstictic acid and no lichenicolous behavior was observed in any specimens from the California. The species occurs on Santa Rosa Island and is frequent on caliche on San Miguel Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: San Miguel Island, east of summit of Green Mountain, *Knudsen 6678* (UCR).

Diplotomma venustum (Körber) Körber, Parerg. Lich.: 179 (1860). Description: Bungartz et al. 2007 (as *Buellia venusta*). Substrate: non-calcareous rock. World distribution: Africa, Asia, Europe, North America. CINP distribution: SM, SR.

PLATE 3, FIG. F.

NOTES. – *Diplotomma venustum* is frequent in California and even grows in the Mojave Desert. It occurs on San Miguel and Santa Rosa Islands.

Selected voucher. – U.S.A. CALIFORNIA. SANTA BARBARA CO.: Santa Rosa Island, Ford Point, on rock, *Knudsen et al. 10491* (UCR).

Dirina catalinariae Hasse, Bryologist 14: 102 (1911). Description: Tehler 2002b. Substrate: non-calcareous rock. World distribution: North and South America. CINP distribution: EA, SB, SC, SM, SR, WA.

PLATE 7, FIG. F.

NOTES. – *Dirina catalinariae* occurs along the California coast from Monterey County to Baja California. We do not distinguish between fertile and non-fertile specimens using infraspecific categories. Specimens from the Channel Islands are usually sterile with well-developed capitate soralia. It occurs on all of the Channel Islands, especially on sea cliffs.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, above Rat Rock, *Knudsen 10668 & Kocourková* (UCR).

Endocarpon loscosii Müll. Arg., Flora 55: 503 (1872). Description: Breuss 2002a. Substrate: soil. World distribution: Europe, North America. CINP distribution: SM, SR.

NOTES. – *Endocarpon loscosii* occurs in biological soil crusts in southern California, but is poorly known. It occurs on San Miguel and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, upper Willow Canyon, on soil in rock crevices, *Knudsen 6951* (UCR).

Endocarpon pallidulum (Nyl.) Nyl. *in* Hue, Nouv. Archiv. Mus., ser. 3, 4: 106 (1892). Description: Breuss 2002a. Substrate: calcareous and non-calcareous rock, or thin soil over rock. World distribution: Asia, Australia, North and South America. CINP distribution: uncertain (Santa Barbara Island?).

NOTES. – *Endocarpon pallidulum* is rare in southern California. The species was reported from the north Channel Islands by Breuss (2002a) without the citation of a specific collection or island. Breuss no longer had his records for this treatment when contacted.

No voucher specimen was examined for this study.

Endocarpon petrolepidium (Nyl.) Hasse, Bryologist 18: 92 (1915). Description: Breuss 2002a. Substrate: non-calcareous rock. World distribution: Asia, North America. CINP distribution: SC, SR.

NOTES. – *Endocarpon petrolepidium* is currently known in California only from the Channel Islands. Hasse reported it from the Santa Monica Mountains but it has not been rediscovered there (Hasse 1915). It is rare on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, *Nimis 18491* (SBBG).

Endocarpon pusillum Hedwig, Descr. Micr.-Anal. Musc. Frond. 2: 56 (1789). Description: Breuss 2002a. Substrate: soil. World distribution: cosmopolitan. CINP distribution: SB, SC, SM, SR, WA.

PLATE 8, FIG. A.

NOTES. – *Endocarpon pusillum* is common throughout California in biological soil crusts. Specimens can often be poorly developed or infertile but can be determined by their long carbonized rhizohyphae. On San Miguel Island, where soil is derived from caliche, specimens can be very pruinose as in the specimen illustrated herein. The species occurs on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, San Miguel Hill, on calcareous soil, *Knudsen 6701* (UCR).

Endocarpon simplicatum (Nyl.) Nyl., Revue Bot. 6: 104 (1888). Description: Breuss 2002a. Substrate: soil. World distribution: Australia, Europe, North America. CINP distribution: SC, SR.

NOTES. – *Endocarpon simplicatum* is only known in California from biological soil crusts on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, above Fraser Point, *Nash 32426* (ASU; det. Breuss).

***Endococcus matzeri** D. Hawksw. & Iturr., Antarctic Sci. 18: 296 (2006). Description: Kainz and Triebel 2002 (as *Endococcus buelliae*, a misapplied name). Substrate: *Buellia* and *Diplotomma* species. World distribution: Antarctica, North America. CINP distribution: SR.

NOTES. – *Endococcus matzeri* is lichenicolous on *Buellia* and *Diplotomma* species and infrequent fromsouthern California to Baja California (Kocourková et al. 2012). It is known in CINP from a single collection made on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, on *Diplotomma venustum*, *Kocourková & Knudsen s.n.* (PRM 909682).

***Endococcus stigma** (Körber) Stizenb., Ber. Thätigk. St. Gallischen Naturwiss. Ges. 22: 516, no. 1338 (1882). Description: Kainz and Triebel 2004. Substrate: *Acarospora* species. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – *Endococcus stigma* is lichenicolous on *Acarospora* species and frequent in southern California (Kocourková et al. 2012). It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, along Army Road, on *Acarospora socialis*, *Knudsen 7408 & Baguskus* (UCR).

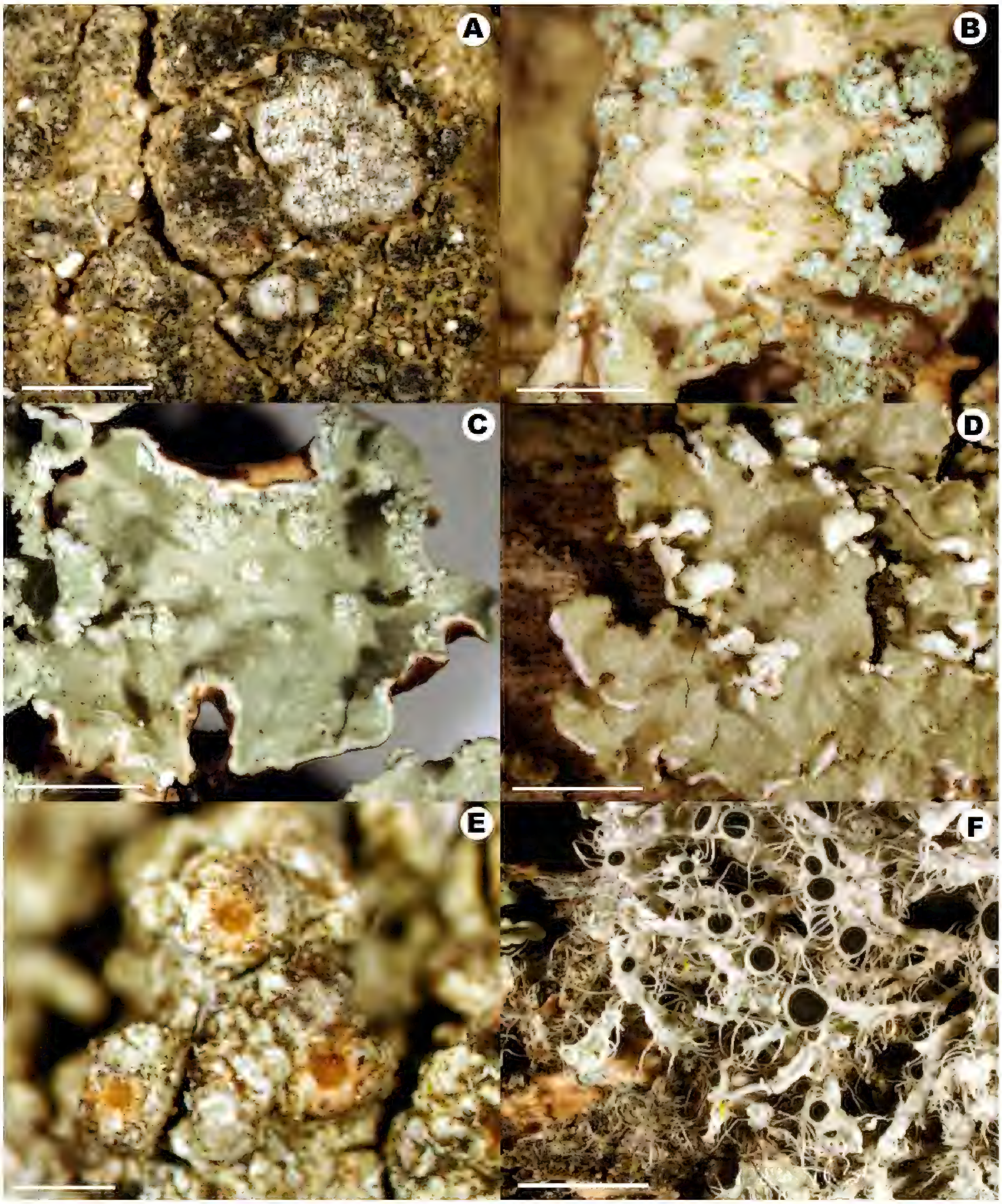

Plate 8, A, *Endocarpon pusillum* (*Knudsen 6757*, UCR). B, *Evernia prunastri* (*Lendemer 14783*, NY). C, *Flavopunctelia flaventior* (*Lendemer 11448*, NY). D, *F. soredica* (*Lendemer 2645*, NY). E, *Gyalecta herrei* (*Knudsen 8746*, UCR). F, *Heterodermia erinacea* (*Knudsen 7248.2*, UCR). Scales = 2.0 mm in F; 1.0 mm in A-D; 0.5 mm in E.

Endococcus thelommatis Kocourk. & K. Knudsen, Biblioth. Lichenol. 106: 174-175 (2011). Description: Kocourková and Knudsen 2011. Substrate: *Thelomma santessonii,* possibly *T. mammosum.* World distribution: North America (California endemic). CINP distribution: SR.

NOTES. – *Endococcus thelommatis* is lichenicolous on *Thelomma santessonii* and is frequent in southern California (Kocourková et al. 2012). It is frequent on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on *Thelomma santessonii*, *Knudsen 7414.2* (UCR).

Evernia prunastri (L.) Ach., Lich. Univ.: 442, tab. 10, fig. 1 (1810). Description: McCune and Geiser 2009. Substrate: smooth bark. World distribution: Asia, Europe, North America. CINP distribution: SC, SM, SR.

PLATE 8, FIG. B.

NOTES. – The sorediate *Evernia prunastri* is common in California (the illustration herein shows the soralia). In CINP it is common on San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, along ridge to Ragged Mountain, on pine, *Ryan 31526-B* (ASU).

Flavopunctelia flaventior (Stirton) Hale, Mycotaxon 20: 682 (1994). Description: Egan 2004. Substrate: bark, especially oaks, rarely on wood or rocks. World distribution: cosmopolitan. CINP distribution: SC, SR.

PLATE 8, FIG. C.

NOTES. – *Flavopunctelia flaventior* is common throughout California and often grows on oaks. It is common on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Bee Canyon, on fence posts, *Nash 32761* (ASU).

Flavopunctelia soredica (Nyl.) Hale, Mycotaxon 20: 682 (1994). Description: Egan 2004. Substrate: bark, rocks. World distribution: cosmopolitan. CINP distribution: SC, SR.

PLATE 8, FIG. D.

NOTES. – *Flavopunctelia soredica* is infrequent in southern and central California and is restricted to more mesic sites than *F. flaventior*. It is less frequent than *F. flaventior* on the Channel Islands and occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, near Black Mountain, *Wetmore 73541* (ASU, MIN; det. Egan).

Fulgensia desertorum (Tomin) Poelt, Mitt. Bot. Staatssamml. München 5: 600 (1965). Description: Kasalicky 2004. Substrate: soil. World distribution: northern hemisphere. CINP distribution: SR.

NOTES. – *Fulgensia desertorum* is rare in California. We suspect it was once more common in biological soil crusts on the north Channel Islands. Several species of *Fulgensia* are found on San Nicolas Island where biological soil crusts are more intact. It is known from a single collection made on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on soil, *Knudsen 8959.2* (UCR)

Fuscopannaria coralloidea P.M. Jørg., Bryologist 103: 681 (2000). Description: Jørgensen 2002a. Substrate: soil. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Fuscopannaria coralloidea* is infrequent in California, reaching the limit of its range in southern California where specimens are often poorly developed. It is infrequent on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, central valley, *Bratt 3684* (SBBG; det. Jørgensen).

Fuscopannaria praetermissa (Nyl.) P.M. Jørg., J. Hattori Bot. Lab. 76: 205 (1994). Description: Jørgensen 2000a. Substrate: soil. World distribution: Antarctica, temperate northern hemisphere. CINP distribution: SC, SR.

NOTES. – *Fuscopannaria praetermissa* is a apparently rare montane species in California, with only two historical collections by H.E. Hasse from the San Gabriel Mountains in southern California (Jørgensen 2000). It is rare on Santa Cruz and Santa Rosa Islands in CINP. But though the species is reported from the Channel Islands (Jørgensen 2002) there are no specimens at ASU and SBBG from Channel Islands annotated by P.M. Jørgensen (CNALH 2012). All these specimens need revision, including the voucher cited below.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Twin Faults, on soil, *Wetmore 73822* (MIN).

Gyalecta herrei Vězda, Annot. Zool.-Bot. 13: 1 (1963). Description: Ryan and Nimis 2004. Substrate: bark, sometimes on soil or decaying rock. World distribution: North America (California endemic). CINP distribution: SC, SR, WA.

PLATE 8, FIG. E.

NOTES. – *Gyalecta herrei* is a California endemic. Though the species usually occurs on bark, it was collected on the decaying rock of a shady seasonal waterfall on Santa Rosa Island growing mixed with *G. jenensis*. It occurs on West Anacapa, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on twigs of coastal sage shrubs, *Knudsen 10883.1* (UCR).

Gyalecta jenensis (Batsch) Zahlbr., Cat. Lich. Univ. 2: 720 (1924). Description: Ryan and Nimis 2004. Substrate: calcareous rock, mortar, or soil, sometimes on mosses. World distribution: Africa, Europe, North America. CINP distribution: EA, SR, WA.

NOTES. – *Gyalecta jenensis* is a calciphile which is rare along the south and central coast of California. It occurs on Anacapa and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, lower Oak Canyon, on shaded calcium-entrusted basalt, *Knudsen 10882* (UCR)

Harpidium nashii Scheidegger *in* Schultz et al., Bryologist 103: 802 (2000). Description: Schultz et al. 2000. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SC.

NOTES. – The crustose cyanolichen *Harpidium nashii* is a globally rare species. It is known in California from a single collection made on Santa Cruz Island and from two collections from Baja California in Mexico. The species has not been rediscovered in CINP since its original collection in 2007.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, N side of Central Valley, on volcanic rock, *Printzen s.n.* (hb. Printzen).

Heterodermia erinacea (Ach.) W.A. Weber, Bryologist 90: 163 (1987). Description: Moberg and Nash 2000. Substrate: bark, cacti. World distribution: North America. CINP distribution: SC, SR, WA.

PLATE 8, FIG. F.

NOTES. – *Heterodermia erinacea* is common along the coast of Baja California though infrequent northward along the California coast. It occurs on West Anacapa, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on *Adenostoma fasciculatum, Marsh 6903* (ASU; det. Moberg).

Heterodermia leucomela (L.) Poelt, Nova Hedwigia 9: 31 (1965). Description: Moberg and Nash 2000. Substrate: bark. World distribution: North and South America. CINP distribution: SC, SM, SR, WA.

PLATE 9, FIG. A.

NOTES. – *Heterodermia leucomela* is a sorediate species that is common along the California coast and is part of the tropical element in the western North America lichen biota. It occurs on West Anacapa, Santa Cruz, San Miguel, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, summit of Black Mountain, common on moss on *Quercus tomemtella, Knudsen 7377 & Baguskus* (UCR).

Heterodermia namaquana Brusse, Bothalia 22: 183 (1992). Description: Moberg and Nash 2000. Substrate: bark of various phorophytes. World distribution: Africa, North America. CINP distribution: SB, SC, SM, SR, WA.

PLATE 9, FIG. B.

NOTES. – *Heterodermia namaquana* is common along the coast of central California in San Luis Obispo and Monterey Counties. It occurs on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Sandy Point, on *Isomeris, Knudsen 7801* (UCR).

Hyperphyscia adglutinata (Flörke) H. Mayrhofer & Poelt, Herzogia 5: 62 (1979). Description: Moberg 2002a. Substrate: bark, especially oaks. World distribution: Africa, Europe, North and South America. CINP distribution: SC.

NOTES. – *Hyperphyscia adglutinata* is common on oaks in California and can easily be overlooked. It is currently only known from Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Islay Canyon, on *Quercus*, *Bratt 6421* (SBBG; det. Esslinger).

Hyperphyscia confusa Essl., C.A. Morse & S. Leavitt, Bryologist 115: 31-32. Description: Esslinger et al. 2012. Substrate: bark, rarely on rock. World distribution: North America. CINP distribution: SC.

NOTES. – *Hyperphyscia confusa* occurs on Santa Cruz Island on rock as it does in a recent collection from the San Jacinto Mountains (*Knudsen 15085*, UCR).

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Cañada del Puerto, on rock, *Ryan 31628* (ASU).

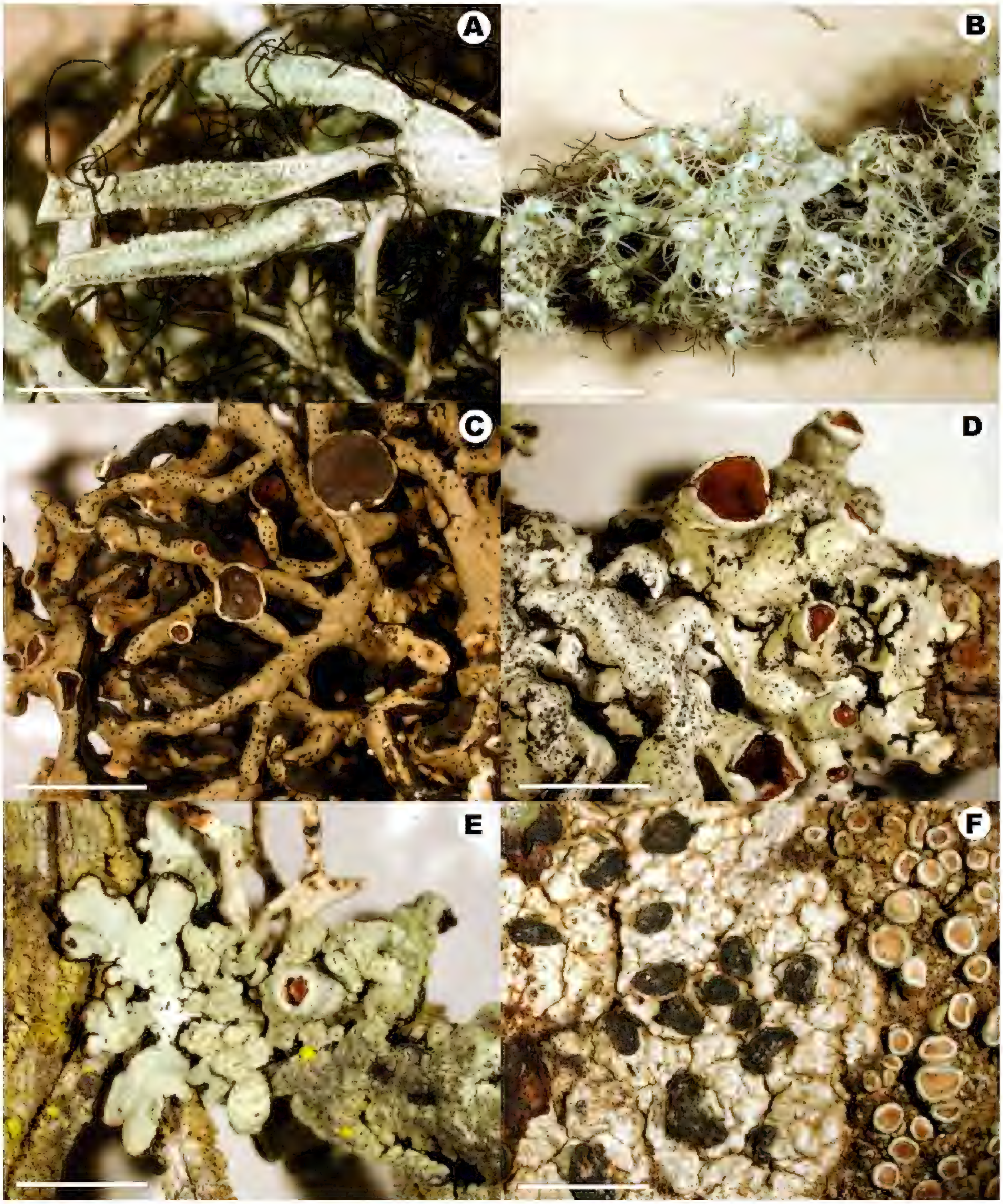

Plate 9, A, *Heterodermia leucomela* (*Knudsen 6817*, UCR). B, *H. namaquana* (*Knudsen 7248.1*, UCR). C, *Hypogymnia gracilis* (*Hasse s.n.*, NY). D, *Hypogymnia minilobata* (*Lendemer 5706*, NY). E, *Hypogymnia mollis* (*Knudsen 11084*, UCR). F, *Lecanactis californica* (*Knudsen 10912.1*, UCR). Scales = 2.0 mm in C-E; 1.0 mm in A, B and F.

Hypocenomyce scalaris (Ach. *ex* Lilj.) M. Choisy, Bull. Mens. Soc. Linn. Lyon 20: 133 (1951). Description: Timdal 2002a. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – This is a common montane species in California, even colonizing burnt wood. It is known from a single collection on Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, 4.5 km E of radar station, on wood, *Nash 32486* (ASU; det. Timdal).

Hypogymnia gracilis McCune, Lichen Flora of the Greater Sonoran Desert Region 1: 231 (2002). Description: McCune 2002. Substrate: bark. World distribution: North America. CINP distribution: SC.

PLATE 9, FIG. C.

NOTES. – *Hypogymnia gracilis* is widespread but infrequent along the coast of southern and central California. The illustration presented here is of a historic collection by H.E. Hasse from the Santa Monica Mountains where it has likely been extirpated by frequent fires in the chaparral. It occurs on Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, eastern Pines, on manzanita, *Bratt 1995-A* (SBBG; det. McCune).

Hypogymnia heterophylla L.H. Pike, Mycotaxon 16: 157 (1982). Description: McCune 2002. Substrate: bark. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Hypogymnia heterophylla* is a common northern species with disjunct populations at the southern limit of its distribution on the north Channel Islands. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, ridge to Ragged Mountain, on bark, *Ryan 31523* (ASU, UCR; det. McCune).

Hypogymnia imshaugii Krog, Norsk Polarinst. Skrifter 144: 96 (1968). Description: McCune 2002. Substrate: bark. World distribution: North America. CINP distribution: SC.

NOTES. – *Hypogymnia imshaugii* is common in California and is often locally abundant, especially in old growth chaparral. Like many species that occur in this habitat it can disappear from an area with increased fire frequencies. In CINP it occurs on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, 1 mile W of Navy Base, on *Quercus agrifolia*, *Bratt 2081* (SBBG; det. McCune).

Hypogymnia minilobata McCune & Schoch, Bryologist 112: 97 (2009). Description: McCune and Schoch 2009. Substrate: bark, wood. World distribution: North America (California endemic). CINP distribution: SC, SR.

PLATE 9, FIG. D.

NOTES. – The recently described *Hypogymnia minilobata* is a California endemic occurring along the southern and central California coast as well as on the north Channel Islands. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, off Telegraph Road, on old wood of manzanita, *Knudsen 10619* (UCR).

Hypogymnia mollis L.H. Pike & Hale, Mycotaxon 16: 161 (1982). Description: McCune 2002. Substrate: bark. World distribution: North America. CINP distribution: SC, SR, WA.

PLATE 9, FIG. E.

NOTES. – *Hypogymnia mollis* is a distinctive sorediate species that occurs along the coast of California and Mexico. It is locally abundant in the Los Osos area of San Luis Obispo County and on the Channel Islands. It occurs on West Anacapa, Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on *Pinus muricata*, *Knudsen 10585* (UCR).

Hypogymnia schizidiata McCune, Lichen Flora of the Greater Sonoran Desert Region, 1: 236 (2002). Description: McCune 2002. Substrate: bark. World distribution: North America (islands of Baja California and north Channel Islands). CINP distribution: SC, SR.

NOTES. – *Hypogymnia schizidiata* is a rare species only known in California from four collections made on Santa Cruz Island (Christi Pines, collected by C. Bratt in 1981 and 1983) and Santa Rosa Island (near Black Mountain, collected by T.H. Nash and B.D. Ryan in 1994) on Bishop Pines. Both populations were not rediscovered during recent inventory work and more fieldwork is needed to establish that they have not been extirpated. This is a real possibility on Santa Rosa Island where the Bishop Pines were heavily impacted by grazing. The species is listed as globally rare by the California Department of Fish and Game (McCune 2006).

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, near Black Mountain, on old *Pinus muricata*, *Nash 33051-A* (ASU; det. McCune).

Hypogymnia tubulosa (Schaerer) Hav., Bergens Mus. Aarbog. Hefte 1, Naturvidensk Rakke 1917-18: 31 (1918). Description: McCune 2002. Substrate: bark. World distribution: northern hemisphere. CINP distribution: SC.

NOTES. – *Hypogymnia tubulosa* is widespread in temperate North America but is infrequent along the central California coast in Santa Barbara County. It occurs only on Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Ridge Road, above Centinela, on *Quercus chrysolepis*, *Bratt 1815* (SBBG; verif. McCune).

Hypotrachyna afrorevoluta (Krog & Swinscow) Krog & Swinscow, Lichenologist 19: 420 (1987). Description: Krog and Swinscow 1987; Knudsen and Lendemer 2005; Lendemer 2006. Substrate: bark, rock. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. –*Hypotrachyna afrorevoluta* is a sorediate species that has been identified from Marin County and Santa Cruz Island. The population on Santa Cruz Island was collected in Christi Pines and was previously identified as *H. revoluta* (Flörke) Hale. It is possible both species occur on the Channel Islands or all specimens identified in the past as *H. revoluta* are actually *H. afrorevoluta.* In this paper only *H. afrorevoluta* is accepted as occurring on the islands pending a revision of the specimens identified as *H. revoluta.*

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Christi Pines, on *Pinus muricata*, *Knudsen et al. 8563* (UCR, det. Lendemer).

Ingvariella bispora (Nagl.) Guderley & Lumbsch, Nova Hedwigia 64: 152 (1997). Description: Lumbsch 2004. Substrate: non-calcareous rock. World distribution: cosmopolitan in alpine habitats. CINP distribution: SR.

NOTES. – *Ingvariella bispora* is only known from California from Santa Rosa Island (Lumbsch 2002). The actual specimen was not cited in that publication. The taxon was recently transferred from Thelotremataceae to Stictidaceae (Fernández-Brime et al. 2011).

No voucher specimen was seen for this study.

***Intralichen baccisporus** D. Hawksw. & M.S. Cole, Fungal Diversity 11: 89 (2002). Description: Hawksworth and Cole 2002. Substrate: *Caloplaca* species. World distribution: Europe, North America. CINP distribution: SC, SR.

NOTES. – The fungus *Intralichen baccisporus* is probably frequent in California on species of *Caloplaca* but rarely collected or reported. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, above Water Canyon, on *Caloplaca bolacina*, *Kocourková & Knudsen s.n.* (PRM 909535)

***Intralichen lichenicola** M.S. Christ. & D. Hawksw., Fungal Diversity 11: 93 (2002). Description: Hawksworth and Cole 2002. Substrate: wide range of lichens. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – *Intralichen lichenicola* was recently reported new to North America from Santa Rosa Island (Kocourková et al. 2012). It is only known from California from Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, near Burma Road, on *Lecanora dispersa* group, *Kocourková & Knudsen s.n.* (PRM 909118).

†Julella vitrispora (Cooke & Harkness) M.E. Barr, Sydowia 38: 13 (1986). Description: Aptroot 2002b. Substrate: bark. World distribution: pantropical. CINP distribution: SC.

NOTES. – *Julella vitrispora* is common in Mexico extending north at least into coastal southern California. It occurs on Santa Cruz Island in CINP.

Selected voucher. – U.S.A. CALIFORNIA. SANTA BARBARA CO.: Santa Cruz Island, Islay Canyon Rd., on bark, *Tucker 35602-B* (ASU, SBBG; det. Aptroot).

Kaernefeltia merrillii (DuRietz) Thell & Goward, Bryologist 97: 393 (1994). Description: Thell 2002. Substrate: bark, wood. World distribution: Europe, North America. CINP distribution: SC, SR.

NOTES.– *Kaernefeltia merrillii* is frequent in California and often locally abundant on old growth chaparral in southern California and Baja California. *Kaernefeltia californica* (Tuck.) Thell & Goward occurs on the central coast of California from San Luis Obispo north but has not been discovered on the Channel Islands. *Kaernefeltia merrillii* occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Black Mountain, on *Pinus muricata*, *Knudsen et al. 7646* (UCR).

Koerberia sonomensis (Tuck.) Henssen, Canad. J. Bot. 41: 1351 (1963). Description: McCune and Geiser 2009. Substrate: non-calcareous rock. World distribution: Africa, Europe, North America. CINP distribution: SC.

NOTES.– *Koerberia sonomensis* is infrequent in California, especially in the mountains, becoming more common in the Pacific Northwest. In CINP it is known from a single collection on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, 4.5 km E of radar station, on rock, *Nash 32448-A* (ASU).

Lecanactis californica Tuck., Synops. N. Amer. Lich. 2: 115 (1888). Description: Ryan and Tehler 2002. Substrate: bark, seashore rocks. World distribution: North America. CINP distribution: EA, SC, SM, SR, WA.

PLATE 9, FIG. F.

NOTES. – *Lecanactis californica* is a common maritime lichen on shrubs along the southern and central California coast. It occurs on Anacapa, Santa Cruz, San Miguel, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: East Anacapa Island, on dead *Baccharis* branches, *Knudsen 5291* (UCR).

Lecanactis salicina Zahlbr. *in* Hasse, Bryologist 11: 7 (1906). Description: Ryan and Tehler. 2002. Substrate: bark, pine cones. World distribution: North America. CINP distribution: SC.

NOTES. – *Lecanactis salicina* is less infrequent in coastal California than *L. californica*. It differs from *L. californica* especially in having smaller apothecia and lacking psoromic acid. *Lecanactis dubia* G. Merr. lacks psoromic acid like *L. salicina* but has longer ascospores. That species is only known from a historical collection from Santa Catalina Island and may be discovered in CINP. Within CINP *Lecanactis salicina* is known only from a single collection made on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Islay Canyon Road, *Bratt 3122-A & Larson* (SBBG; det. Egea).

Lecania brunonis (Tuck.) Herre, Proc. Wash. Acad. Sci. 3: 188 (1910). Description: v.d. Boom and Ryan 2004. Substrate: non-calcareous rock, serpentine. World distribution: North America. CINP distribution: SB, SC, SM, SR, WA.

NOTES. – *Lecania brunonis* is common in coastal California. The thallus is quite variable, from areolate to squamulose, but the 1-septate ascospores are consistently 10–15 x 4–6 µm. It occurs on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: West Anacapa Island, on basalt, *Knudsen 10813* (UCR).

Lecania caloplacicola B.D. Ryan & v.d. Boom, Lichen Flora of the Greater Sonoran Desert Region 2: 150 (2004). Description: v.d. Boom and Ryan 2004. Substrate: juvenile parasite on *Caloplaca* species on calcareous or non-calcareous rock, developing an independent lichenized thallus. World distribution: North America (California endemic). CINP distribution: SR (endemic).

PLATE 10, FIG. A.

NOTES. – *Lecania caloplacicola* is endemic to Santa Rosa Island. It is a juvenile parasite on *Caloplaca bolacina* and probably *C. ludificans*. It was described from two collections made by B.D. Ryan on Sandy Point, where it is rare. The species is only known from one other population on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, between Arlington and Soledad Canyon, parasitic on *Caloplaca bolacina* with well developed independent thallus on HCl- rock, *Knudsen et al. 8923* (UCR).

Lecania cyrtella (Ach.) Th. Fr., Lichenogr. Scandin. 1: 294 (1871). Description: v.d. Boom and Ryan 2004. Substrate: on smooth bark, including *Eucalyptus*. World distribution: cosmopolitan. CINP distribution: SC, SM, SR.

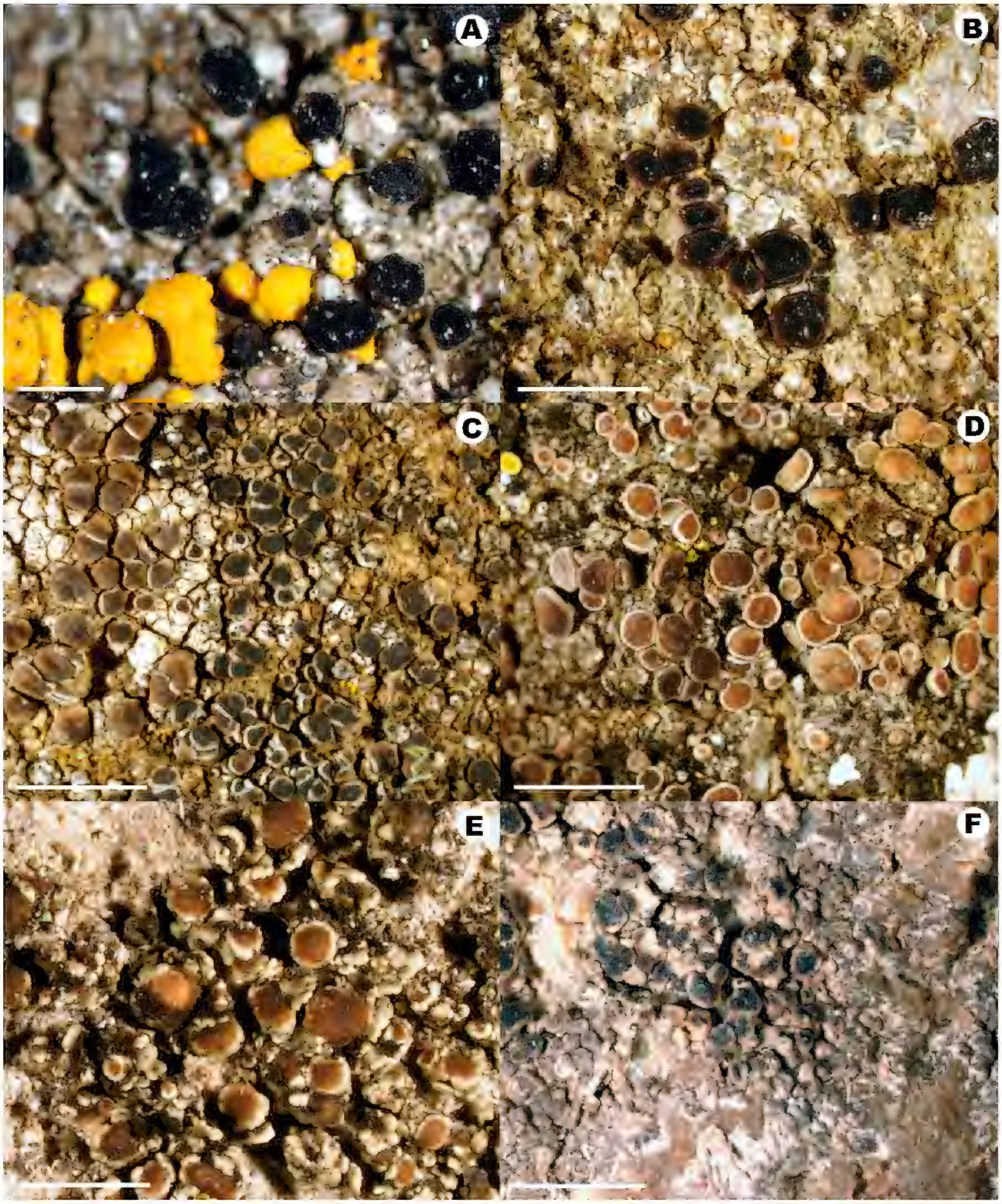

Plate 10, A, *Lecania caloplacicola* (*Knudsen 8923*, UCR). B, *L. franciscana* (*Knudsen 6820*, UCR). C, *L. fructigena* (*Knudsen 10850*, UCR). D, *L. fuscella* (*Knudsen 5308*, UCR). E, *L. hassei* (*Knudsen 8685.1*, UCR). F, *L. pacifica* (*Knudsen 8182*, UCR). Scales = 2.0 mm in C; 1.0 mm in B, D-F; 0.5 mm in A

NOTES. – *Lecania cyrtella* is common along the California coast from Monterey to San Diego County. It is often associated with *Physcia adscendens* (Fr.) H. Olivier, *Xanthoria* and *Xanthomedoza* species especially on elder berry, coastal sage shrubs, and maritime chaparral. It is a fast growing pioneer and is replacing many rare crustose species in areas with high fire frequencies. It is tolerant of artificial enrichment by nitrogen. All specimens examined had eight ascospores per ascus. Though lumped with *L. cyrtella* by v.d. Boom and Ryan (2004), specimens with 10–16 ascospores per ascus, mostly 3–4 µm wide, and with a hymenium usually shorter than 40 µm, are referable *Lecania sambucina* (Körb.) Arnold, which has not yet been discovered in North America. *Lecania cyrtellina* (Nyl.) Sandst., also not yet reported for North America, has 8-spored asci with broader ascospores than *L. cyrtella*, and the ascospores usually lack septa. *Lecania cyrtella* occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Carrington Point, on *Lupinus albifrons*, *Knudsen et al. 10548* (UCR).

Lecania dudleyi Herre, Proceed. Wash. Acad. Sci. 12: 188 (1910). Description: v.d. Boom and Ryan 2004. Substrate: calcareous and non-calcareous rock and soil. World distribution: North America. CINP distribution: SB, SC, SM, SR.

NOTES. – *Lecania dudleyi* is common along the California coast from Baja California to at least as far north as Santa Cruz County, often occurring in biological soil crusts. The species occurs on San Miguel, Santa Barbara, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, bluffs west of Verde Canyon, on consolidated soil, *Knudsen et al. 8926* (UCR).

Lecania franciscana (Tuck.) K. Knudsen & Lendemer, Mycotaxon 101: 85 (2007). Syn.: "*Lecania subdispersa* (Nyl. *ex* B.D. Ryan) emed. B.D. Ryan" (v.d. Boom & Ryan 2004; Knudsen & Lendemer 2007). Description: v.d. Boom and Ryan 2004 (as *Lecania subdispersa*). Substrate: calcareous and non-calcareous rock. World distribution: North America (California endemic). CINP distribution: SB, SC, SM, SR.

PLATE 10, FIG. B.

NOTES. – *Lecania franciscana* is relatively infrequent along the coast of California occurring from San Francisco (the type locality is in Oakland) to the Santa Monica Mountains, and is especially common on caliche on San Miguel Island and on San Nicolas Island. In CINP it occurs on San Miguel, Santa Barbara, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on rock, *Knudsen 11916.1* (UCR).

Lecania fructigena Zahlbr. *in* Hasse, Bryologist 17: 61 (1914). Description: v.d. Boom and Ryan 2004. Substrate: calcareous and non-calcareous rock. World distribution: Europe, North America, New Zealand. CINP distribution: EA, SB, SC, SM, SR, WA.

PLATE 10, FIG. C.

NOTES. – *Lecania fructigena* is especially common on boulders and cliffs exposed to salt spray along the coast. The only other species occurring in this microhabitat is *L. pacifica* which is relatively rare along coast from San Simeon to the Palos Verdes Peninsula. That species is distinguished from *L. fructigena* by its usually orbicular thallus with a conspicuous prothallus. *Lecania fructigena* is common on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on volcanic rock, *Knudsen 11951* (UCR).

Lecania fuscella (Schaerer) Körber, Syst. Lich. Ger. 122 (1855). Description: v.d. Boom and Ryan 2004. Substrate: on bark. World distribution: Africa, Europe, North America. CINP distribution: EA, SB, SR, WA.

PLATE 10, FIG. D.

NOTES. – *Lecania fuscella* is infrequent along the coast of California from the Santa Monica Mountains (where it is probably now extirpated) north to Santa Barbara County. *Lecania fuscelloides* B.D. Ryan & v.d. Boom is probably is a synonym of *L. fuscella* and is currently not recognized as occurring in CINP. *Lecania fuscella* occurs on Anacapa, Santa Barbara, San Miguel, and Santa Rosa Islands and is often locally abundant.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA VENTURA CO.: East Anacapa Island, on *Leptosyne gigantea*, *Knudsen 10913* (UCR).

Lecania hassei (Zahlbr.) W. Noble *in* Ahti et al., Mycotaxon 28: 93 (1987). Description: v.d. Boom and Ryan 2004 (as *L. hassei* and *L. brattiae* B.D. Ryan & v.d. Boom, the latter of which is a synonym), Knudsen & Lendemer 2007. Substrate: usually non-calcareous rock. World distribution: North America. CINP distribution: EA, SB, SC, SR, WA.

PLATE 10, FIG. E.

NOTES**.** – *Lecania hassei* is frequent on the Channel Islands, though rare along the California coast. It was originally described from the Santa Monica Mountains. The thallus of the species can be variable, from areolate to squamulose. It occurs on Anacapa, Santa Barbara, Santa Cruz, and Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, top of East Point, on rock, *Knudsen 8840.1* (UCR).

Lecania inundata (Hepp *ex* Körber) M. Mayrhofer *in* Nimis & Poelt, Studia Geobot. 7: 111 (1987). Description: v.d. Boom and Ryan 2004. Substrate: calcareous rock, concrete. World distribution: Europe, North America. CINP distribution: SC, SM, SR.

NOTES. – *Lecania inundata* is infrequent on the Channel Islands and is known from only a few collections elsewhere along the California coast. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, ridge above Chinese Harbor, on concrete rim of cistern, *Knudsen et al. 8530* (UCR).

Lecania naegelii (Hepp) Diederich & v.d. Boom, Bull. Soc. Nat. Luxemb. 95: 154 (1994). Description: v.d. Boom and Ryan 2004. Substrate: bark. World distribution: Europe, North America. CINP distribution: SC, SM, SR.

NOTES. – *Lecania naegelii* is frequent along the California coast where it occurs on coastal sage shrubs and chaparral, often with *L. crytella.* It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, Willow Canyon, on smooth bark of willow, *Knudsen 6915* (UCR).

Lecania pacifica Zahlbr. *ex* B.D. Ryan & v.d. Boom, Lichen Flora of the Greater Sonoran Desert Region 2: 162. Description: v.d. Boom and Ryan 2004. Substrate: non-calcareous rock. World distribution: North America (California endemic). CINP distribution: SB, SC, SR.

PLATE 10, FIG. F.

NOTES. – *Lecania pacifica* in infrequent in southern and central California along the coast and often grows in the salt spray zone with *L. fructigena*. It occurs on Santa Barbara, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, mouth of wash on Bechers Bay, on rock, *Knudsen 8981* (UCR).

Lecania rabenhorstii (Hepp) Arnold, Flora 67: 403 (1884). Description: v.d. Boom and Ryan 2004. Substrate: usually on calcareous rocks. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – *Lecania rabenhorstii* appears to be rare in southern and central California, but may be overlooked. It is known only from Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, bluffs west of Verde Canyon, on rock, *Knudsen 8932* (UCR).

Lecania ryaniana v.d. Boom, Lichen Flora of the Greater Sonoran Desert Region 2: 165 (2004). Description: v.d. Boom and Ryan 2004. Substrate: caliche, usually calcareous rock. World distribution: North America (California endemic). CINP distribution: SM, SR.

PLATE 11, FIG. A.

NOTES. – *Lecania ryaniana* is endemic to California, occurring only on calcareous substrates on San Miguel and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Sandy Point, on caliche, *Knudsen et al. 7792.1* (UCR).

Lecania toninioides Zahlbr., Beih. Bot. Centrabl. 8: 106 (1902). Description: v.d. Boom and Ryan 2004. Substrate: soil, decaying sandstone. World distribution: North America. CINP distribution: SM, SR.

NOTES. – *Lecania toninioides* usually occurs in biological soil crusts and has possibly been extirpated from much of its former range in coastal California, especially on the Channel Islands, by grazing and subsequent soil erosion. It is infrequent on San Miguel and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, ranch area, on soil, *Knudsen 8809* (UCR).

Lecania turicensis (Hepp) Müll. Arg., Mém. Soc. Phys. Genève 16: 386 (1862). Description: v.d. Boom and Ryan 2004. Substrate: calcareous and non-calcareous rock. World distribution: cosmopolitan. CINP distribution: WA, SM, SR.

NOTES. – *Lecania turicensis* is infrequent along the southern and central California coast. It occurs on West Anacapa, San Miguel, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Bee Canyon, on rock, *Knudsen et al. 10507* (UCR).

Lecanographa aggregata Egea & Torrente, Biblioth. Lichenol. 54: 120 (1994). Description: Egea et al. 2004c. Substrate: bark. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – *Lecanographa aggregata* is known from California on the basis of a single collection made on Santa Rosa Island near Black Mountain. This collection may actually represent a species new to science since it was treated as "aff. *aggregata*" by Egea et al. (2004c).

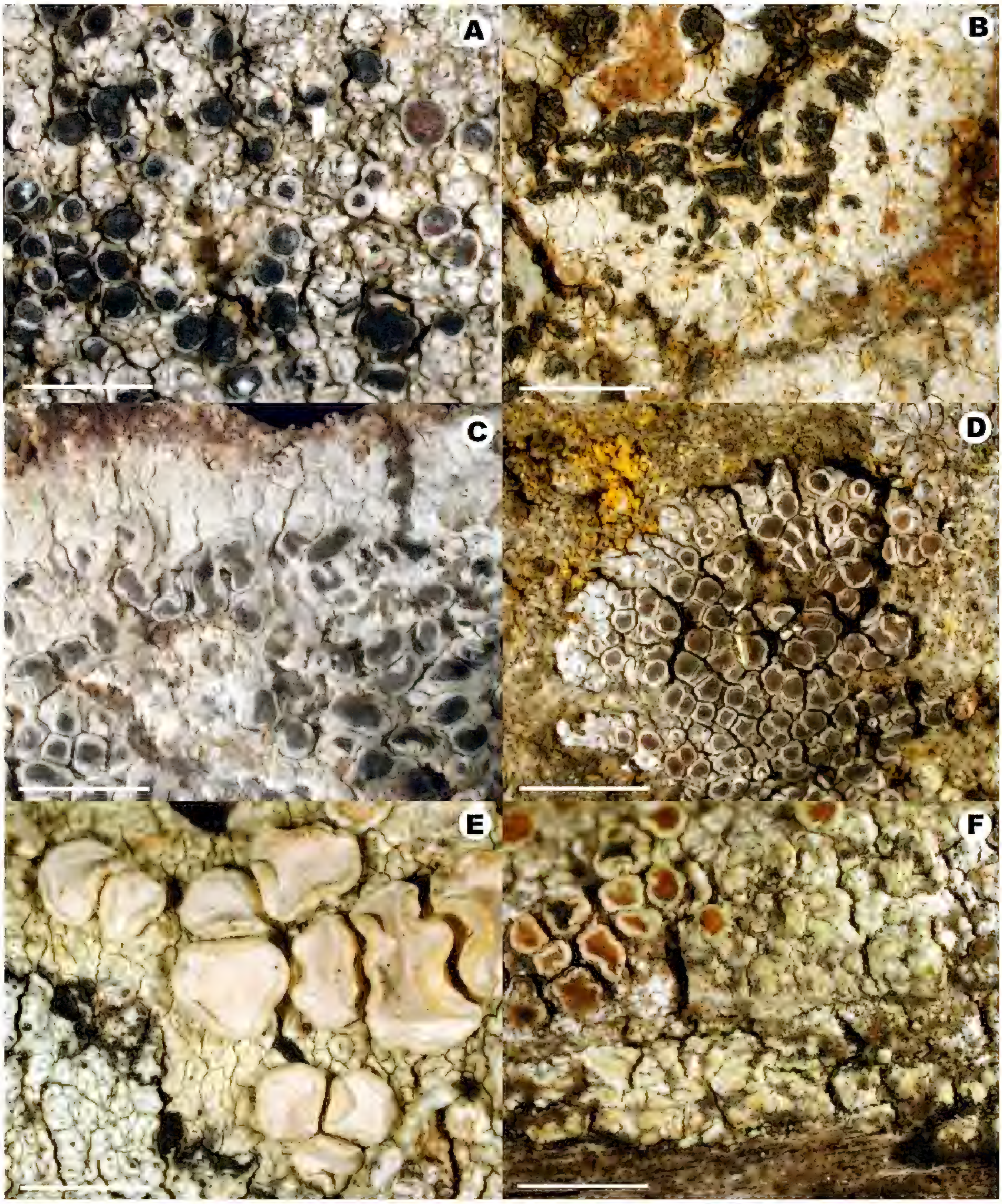

Plate 11, A, *Lecania ryaniana* (*Knudsen 8875.1*, UCR). B, *Lecanographa brattiae* (*Knudsen 10641.1*, UCR). C, *L. hypothallina* (*Knudsen 7476.2*, UCR). D, *Lecanora albocaesiella* (*Knudsen 8929.2*, UCR). E, *Lecanora caesiorubella* (*Knudsen 7597*, UCR). F, *Lecanora carneolutescens* (*Knudsen 6778.1*, UCR). Scales = 2.0 mm in C; 1.0 m in A, B, D-F.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Black Mountain area, on *Quercus tomemtella, Nash 33045* (ASU; det. Egea and Torrente).

Lecanographa brattiae (Egea & Ertz) Ertz & Tehler, Fungal Diversity 49: 55 (2011). Description: Ertz and Egea 2007 (as *Opegrapha brattiae*). Substrate: non-calcareous rock. World distribution: North America. CINP distribution: EA, SB, SC, SM, SR, WA.

PLATE 11, FIG. B.

NOTES. – *Lecanographa brattiae*, occurs along the coast of California in San Luis Obispo County and on the Channel Islands. It was originally discovered on Santa Barbara Island by C. Bratt. The species occurs on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, end of Willow Canyon, on rock, *Knudsen 6920.1* (UCR).

Lecanographa dimelaenoides (Egea & Torrente) Egea & Torrente, Biblioth. Lichnol. 54: 128 (1994). Description: Egea et al. 2004c. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: EA, SB, SC, SM, SR, WA.

NOTES. – *Lecanographa dimelaenoides* occurs only on the Channel Islands in California. It occurs on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, *Nash 37028* (ASU; det. Sparrius).

Lecanographa hypothallina (Zahlbr.) Egea & Torrente, Biblioth. Lichnol. 54: 139 (1994). Description: Egea et al. 2004c. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: EA, SB, SC, SM, SR, WA.

PLATE 11, FIG. C.

NOTES**.** – *Lecanographa hypothallina* is the most common member of the genus in California, occurring at scattered locations along the coast from San Diego north to Point Lobos in Monterey County. It occurs on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Arlington Canyon, *Knudsen 8720 & Kocourková* (UCR).

Lecanographa insolita Lendemer & K. Knudsen, Bryologist 113: 351 (2011). Description: Lendemer and Knudsen 2011. World distribution: North America (California endemic). CINP distribution: SR.

NOTES**.** – *Lecanographa insolita* was recently described from Lobo Canyon on Santa Rosa Island. It is the only member of the genus with a green photobiont. The species is only known from Santa Rosa Island and a few collections made along the coast in Santa Barbara and Monterey Counties as well as the Presidio in San Francisco.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on rock, *Knudsen 11401* (NY, UCR).

Lecanographa lyncea (Sm.) Egea & Torrente, Biblioth. Lichnol. 54: 142 (1994). Description: Egea et al. 2004c. Substrate: dry acidic bark, wood. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Lecanographa lyncea* is frequent in Baja California, but is only known in California from a single collection that was made on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on *Heteromeles arbolifolia, Nash 32955* (ASU; det. Egea).

Lecanographa lynceoides (Mull. Arg.) Egea & Torrente, Biblioth. Lichnol. 54: 147 (1994). Description: Egea et al. 2004c. Substrate: non-calcareous rock. World distribution: North and South America. CINP distribution: SR.

NOTES. – *Lecanographa lynceoides* is only known from California on the basis of a single collection that was made on Santa Rosa Island. The rarity of *L. lyncea* and *L. lynceoides* may be natural, however it may also have been caused by the destruction of native vegetation by grazing of sheep, cattle, and introduced deer and elk.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Bee Canyon, on *Artemisia californica*, *Nash 32738* (ASU; det. Egea).

Lecanora albella (Pers.) Ach., Lich. Univ.: 369 (1810). Description: Ryan et al. 2004a. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Lecanora albella* is a common Holarctic species, known from only a few collections in California. It is easily confused on Channel Islands where *L. caesiorubella* is much more common. Both species have pruinose discs and similar chemistries and are separated mainly by width of pseudocortex and apothecium size. It is occurs on Santa Cruz and Santa Rosa Islands and was only collected by C.M. Wetmore in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Torrey Pine grove, on bark, *Wetmore 73924* (MIN)

Lecanora albocaesiella B.D. Ryan & T.H. Nash *in* Ryan et al., Lichen Flora of the Greater Sonoran Desert Region 2: 190 (2004). Description: Ryan et al. 2004a. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SR.

PLATE 11, FIG. D.

NOTES. – *Lecanora albocaesiella* is rare in California and was described from San Nicolas Island. It is occurs on Santa Rosa Island in CINP

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, bluffs west of Verdes Canyon, on rock, *Knudsen et al. 8929.2* (UCR).

Lecanora andrewii B. de Lesd. *in* M. Andrew, Transact. and Proceed, Botan. Soc. of Edinburgh 26: 184 (1913). Description: Śliwa 2007. Substrate: non-calcareous rock. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – *Lecanora andrewii* is known from a small number of collections across North America. It is only known from California from Lobo Canyon on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on rock, *Ryan 31286-B* (ASU; det. Śliwa).

Lecanora brattiae B.D. Ryan & T.H. Nash *in* Ryan et al., Lichen Flora of the Greater Sonoran Desert Region 2: 200 (2004). Description: Ryan et al. 2004a. Substrate: non-calcareous rock. World distribution: North America (California endemic). CINP distribution: SB, SC.

NOTES. – *Lecanora brattiae* is a rare brown effigurate species that is poorly understood. It was discovered by C. Bratt on Santa Barbara Island and is often associated with *Verrucaria subdivisa*. The species is known from CINP from single collections from Santa Barbara and Santa Cruz Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Barbara Island, Cliff Canyon, *Bratt 3659* (SBBG).

Lecanora caesiorubella Ach., Lich. Univ.: 366 (1810). Description: Ryan et al. 2004a. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SC, SM, SR.

PLATE 11, FIG. E.

NOTES. – *Lecanora caesiorubella* is especially common in coastal California. The Channel Island populations produce norstictic acid and are a favorite food of mites. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Beecher Bay, on corral fences, *Knudsen 8978* (UCR).

Lecanora californica Brodo, Beih. Nova Hedwigia 79: 107 (1984). Description: Ryan et al. 2004a. Substrate: non-calcareous rock. World distribution: North America (California endemic). CINP distribution: SC, SM, SR.

NOTES. – *Lecanora californica* is a California endemic known from the coast from San Mateo to Sonoma Counties as well as the north Channel Islands. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP. Based on our study this name may be a synonym of *Lecanora gangaleoides*.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, along Burma Road, *Knudsen 7781* (NY, UCR).

Lecanora campestris (Schaerer) Hue, Bull. Soc. Bot. France 35: 47 (1888). Description: Ryan et al. 2004a. Substrate: non-calcareous or calcareous rock, soil. World distribution: cosmopolitan. CINP distribution: SC, SR, WA.

NOTES. – *Lecanora campestris* is a common European species which is relatively infrequent in California. Older identifications of this species by Californian lichenologists are generally incorrect. It is rare on Santa Cruz and Santa Rosa Islands and probably also occurs on west Anacapa Island based on our examination of a poor specimen made on consolidated soil in an extensive biological soil crust.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Bee Canyon, on rock, *Nash 32755* (ASU; det. Lumbsch).

Lecanora carneolutescens Nyl., Flora 61: 380 (1858). Description: Ryan et al. 2004a. Substrate: on bark. World distribution: North America. CINP distribution: SM.

PLATE 11, FIG. F.

NOTES. – *Lecanora carneolutescens* is a sorediate species with rare apothecia that was originally described from Mexico. It is only known in California from San Miguel Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, on *Baccharis*, *Knudsen 6710* (UCR).

Lecanora comonduensis T.H. Nash & Hertel, Bryologist 101: 377 (1997), spelling emended in Bryologist 101: 354 (1998). Description: Ryan et al. 2004a. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SC.

NOTES. – *Lecanora comonduensis* is relatively common in Mexico and Arizona. It is only known in California from Santa Catalina Island, where it appears to be frequent, and from two collections on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, ridge to Ragged Mountain, on rock, *Nash 32362* (ASU).

Lecanora confusa Almb., Kongl. Vetensk.-Akad. Avh. Naturk. 11: 72 (1955). Description: Ryan et. al. 2004a. Substrate: bark. World distribution: Europe, North America. CINP distribution: SC, SR.

NOTES. – *Lecanora confusa* is common along the central and southern California coast. It is sometimes sorediate or forms a sterile leprose crust. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Prisoner's Harbor, on *Quercus agrifolia*, *Ryan 31481* (ASU; det. Printzen).

Lecanora crenulata Hook. *in* Smith, Engl. Fl. 5: 190 (1833). Description: Ryan et. al. 2004a; Śliwa 2007. Substrate: calcareous rock. World distribution: Asia, Europe, North America. CINP distribution: SR.

NOTES. – *Lecanora crenulata* is frequent on calcareous substrates in California. It occurs on Sandy Point on Santa Rosa Island and is expected to occur on San Miguel Island on caliche.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Sandy Point, *Nash 32687* (ASU; det. Śliwa).

Lecanora demosthenesii Lumbsch & Messuti *in* Lumbsch et al., Bryologist 106: 554 (2003). Description: Ryan et al. 2004a. Substrate: bark, often on rock. World distribution: North America. CINP distribution: SC, SM, SR.

PLATE 12, FIG. A.

NOTES. – *Lecanora demosthenesii* occurs along the California coast in Monterey County. In CINP it occurs on San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, above Fraser Point, on *Artemisia californica*, *Nash 32390-B* (ASU; det. Lumbsch).

Lecanora dispersa (Pers.) Flörke,Deutsche Lichenen 3: 4 (1815). Description: Ryan et. al. 2004a; Śilwa 2007. Substrate: calcareous or non-calcareous rock, wood and especially dusty bark. World distribution: cosmopolitan. CINP distribution: SM, SR.

NOTES. – *Lecanora dispersa* is frequent in California, but until Śliwa (2007) published her monograph of the *L. dispersa* group in North America it was poorly known. Many older identifications from California are misidentifications of *L. hagenii* andit is currently known from San Miguel and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Windmill Canyon, on rock, *Knudsen 10444* (UCR).

Lecanora expallens Ach., Lich. Univ.: 374 (1810). Description: Ryan et al. 2004a. Substrate: bark, wood, detritus. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Lecanora expallens* is a sorediate to completely leprose species that is relatively rare along the California coast. The name has been used for any leprose crust on bark by some California lichenologists. It occurs on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, road to Ford Point, on wood fence, *Knudsen 10498* (UCR).

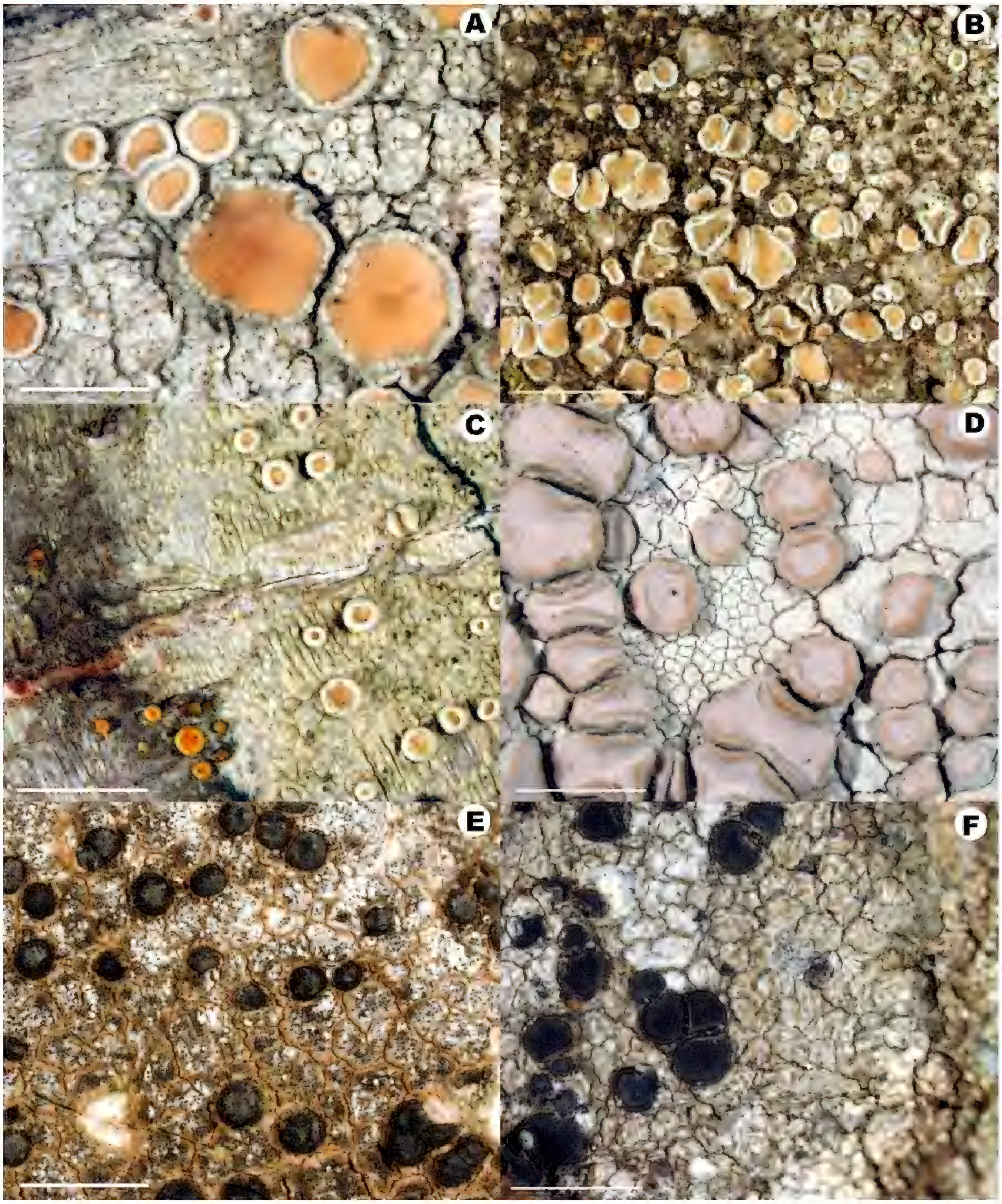

Plate 12, A, *Lecanora demosthenesii* (*Knudsen 7717*, UCR). B, *L. hagenii* (*Knudsen 2350*, UCR). C, *L pacifica* (*Underwood s.n.*, NY). D, *L. subcarnea* (*Knudsen 7451.2*, UCR). E, *Lecidea cruciara* (*Knudsen 8542.1*, UCR). F, *Lecidea fuscoatra* (*Knudsen 8570*, UCR). Scales = 1.0 mm in A-F.

Lecanora gangaleoides Nyl., Flora 55: 354 (1872). Description: Ryan et al. 2004a. Substrate: non-calcareous rock. World distribution: cosmopolitan. CINP distribution: WA, SC, SR.

NOTES. – *Lecanora gangaleoides* is common in California in coastal areas, as well as in scattered locations in the mountains. It occurs on West Anacapa, Santa Cruz and Santa Rosa Islands in CINP. *Lecanora californica* may be a synonym of *L. gangaleoides*, the difference in various published illustrations representing variations in the thalline margin.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Torrey Pine forest, on rock, *Knudsen 7460* (UCR).

Lecanora hagenii (Ach.) Ach., Lich. Univ.: 367 (1810). Description: Ryan et al. 2004a; Śliwa 2007. Substrate: usually on non-calcareous rocks, also on bark, wood, detritus. World distribution: cosmopolitan. CINP distribution: SC, SM, SR.

PLATE 12, FIG. B.

NOTES. – *Lecanora hagenii* is one of the most common *Lecanora* species in California but is probably undercollected as it is easily overlooked. Not only does it occur on a wide range of substrates in diverse habitats, but it is also pollution tolerant. It is easily confused with *L. dispersa* which usually has a P+ orange apothecial margin and slightly different sized ascospores. As with older specimens identified as *L. dispersa,* the name was often misapplied to other taxa of the *L. dispersa* group by some lichenologists. The species is apparently frequent on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on rock, *Knudsen 11963* (UCR).

Lecanora horiza (Ach.) Linds., Trans. Bot. Soc. Edinburgh 9: 96 (1869). Description: Ryan et al. 2004a. Substrate: bark, wood, detritus. World distribution: cosmopolitan. CINP distribution: SB, SC, SM, SR, WA.

NOTES. – *Lecanora horiza* is common in Baja California but is infrequent in southern California and does not appear to occur in the northern part of the state. On the Channel Islands it can be confused with *Lecania fuscella* which differs in having 1-septate ascospores. It occurs on all of the north Channel Islands, on oaks, shrubs, and fences, but is infrequent.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, on fence posts, *Nash 42084* (ASU; det. Lumbsch).

Lecanora laxa (Śliwa & Wetmore) Printzen, Bryologist 104: 395 (2001). Description: Ryan et al. 2004a. Substrate: bark. World distribution: Asia, North America. CINP distribution: SC, SR.

NOTES. – *Lecanora laxa* is a common montane species in California. It is rare on the north Channel Islands, known from single collections from Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on burnt oak wood, *Knudsen 7553* (UCR).

Lecanora muralis (Schreber) Rabenh., Deutschl. Krypt.-Fl. 2: 42 (1845). Description: Ryan et al. 2004a. Substrate: non-calcareous and calcareous rock, including cement. World distribution: cosmopolitan. CINP distribution: SC, SR, WA.

NOTES. – *Lecanora muralis* is probably the most common *Lecanora* in California. It has been pointed out that the oldest name for this taxon is *L. saxicola* (Pollich) Ach. but considering that widespread usage of *L. muralis* it is likely that a proposal for the conservation is imminent. The species occurs on West Anacapa, Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on rock, *Knudsen 10455.1* (UCR).

Lecanora pacifica Tuck., Syn. Lich. 1: 191 (1882). Description: Ryan et al. 2004a. Substrate: bark. World distribution: North America. CINP distribution: SC, SM, SR, WA.

PLATE 12, FIG. C.

NOTES. – *Lecanora pacifica* is common in California along the coast. It occurs on West Anacapa, Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Bee Canyon, on *Artemisia californica*, *Ryan 31077* (ASU; det. Lumbsch).

Lecanora plumosa Mull. Arg., Flora 65: 484 (1882). Description: Ryan et al. 2004a. Substrate: non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Lecanora plumosa* is a common species in Sonoran Mexico but is only known from California from the east end of Santa Rosa Island where it is rare.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, East Point, on rock, *Ryan 31191* (ASU, det. Lumbsch).

Lecanora subcarnea (Lilj.) Ach., Lich. Univ.: 365 (1810). Description: Ryan et al. 2004. Substrate: non-calcareous rock. World distribution: Asia, Europe, North America. CINP distribution: SC, SR.

PLATE 12, FIG. D.

NOTES. – *Lecanora subcarnea* is known in California mainly from the Channel Islands where it can be locally abundant. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Islands, Torrey Pines grove, on rock, *Knudsen 7476.1* (UCR).

Lecanora subimmergens Vainio, Bot. Mag., Tokyo 35: 51 (1921). Description: Ryan et al. 2004a. Substrate: non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Lecanora subimmergens* is common on sandstone outcrops in the Santa Ana and Santa Monica Mountains and infrequent along the California coast at least to San Mateo County. In CINP it is known only from a single collection on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Bee Canyon, on boulder, *Knudsen et al. 8772* (UCR).

Lecanora subrugosa Nyl., Flora 58: 15 (1875). Description: Ryan et al. 2004a. Substrate: bark. World distribution: Africa, Europe, North America. CINP distribution: SC.

NOTES. – *Lecanora subrugosa* is relatively rare in California, being known from scattered locations both near the coast and in the mountains in the southern part of the state. In CINP it is only known from a single collection from Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Prisoners Harbor, on *Quercus agrifolia*, *Ryan 31396* (ASU; det. Lumbsch).

Lecanora substrobilina Printzen, Bryologist 104: 404 (2001). Description: Ryan et al. 2004a. Substrate: bark. World distribution: North America. CINP distribution: SC, SM, SR.

NOTES. – *Lecanora substrobilina* is frequent along the southern and central California coast and is locally abundant in the native Monterey Pine forest in Cambria. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – U.S.A. CALIFORNIA. SANTA BARBARA CO.: Santa Rosa Island, Santa Rosa Island, Black Mountain area, on *Pinus muricata, Wetmore 73921* (ASU, MIN; det. Printzen).

Lecanora verrucariicola B.D. Ryan *in* Ryan et al., Lichen Flora of the Greater Sonoran Desert Region 2: 280 (2004). Description: Ryan et al. 2004a. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SR.

NOTES. – *Lecanora verrucariicola* is known from only a few collections that were made along the coast from Baja California to San Luis Obispo County. It was usually found growing with or over *Verrucaria subdivisa.* There is no evidence as of yet that the species is a juvenile parasite on *V. subdivisa* and eventually develops an independent lichenized thallus. Nonetheless it is definitely competitive for space in saxicolous lichen communities. The taxon was described from Santa Catalina Island and in CINP is only known from a single collection made on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on rock, *Wetmore 73880* (MIN; det. Ryan).

Lecanora zosterae (Ach.) Nyl., Flora 59: 577 (1876). Description: Śliwa 2007. Substrate: detritus, the eelgrass *Zostera* L., most often dry wood, including fences, railroad ties, etc. World distribution: cosmopolitan. CINP distribution: SM.

NOTES. – *Lecanora zosterae* is rare in California. It was collected once in Humboldt County on a the wood of a railroad bridge and is known from two collections made on San Miguel Island, one of which occurred on driftwood.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, lower Willow Canyon, on wood, *Nash 41287* (ASU; det. Śliwa).

Lecidea cruciaria Tuck., Syn. N. Amer. Lich. 2: 67 (1888). Description: Hertel and Printzen 2004. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SC, SR.

PLATE 12, FIG. E.

NOTES. – *Lecidea cruciaria* was described from the Santa Cruz Mountains in central California by E. Tuckerman. It is a poorly known species that is in need of revision. The thallus in illustration presented here is infected by a fungus. In CINP the species is known from single collections from Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, east end, on sandstone, *Knudsen et al. 7413* (UCR).

Lecidea diducens Nyl., Flora 48: 148 (1865). Description: Hertel and Printzen 2004. Substrate: non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – *Lecidea diducens* is a montane species that is infrequent in California. This name has been commonly misapplied by California lichenologists to other members of the genus. Presently the species is only known in CINP from a single collection that was made on Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, above Chinese Harbor, on rock, *Knudsen et al. 8521.1* (UCR).

Lecidea fuscoatra (L.) Ach., Lich. Meth.: 44 (1803). Description: Hertel and Printzen 2004. Substrate: non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SR.

PLATE 12, FIG. F.

NOTES. – *Lecidea fuscoatra* is the common throughout California in a wide variety of habitats. It is currently known in CINP from a single collections from Santa Cruz and Santa Rosa Islands.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry 2Canyon, on rock, *Knudsen 10618* (UCR).

Lecidea laboriosa Müll. Arg., Flora 57: 187 (1874). Description: Hertel and Printzen 2004. Substrate: non-calcareous rock. World distribution: Europe, North and South America. CINP distribution: SC, SM, SR.

PLATE 13, FIG. A.

NOTES**.** – *Lecidea laboriosa* is the most common endolithic *Lecidea* species in southern California, occurring from the coast to the mountains, and in the desert . It occasionally forms an ecorticate areolate thallus, especially when it occurs near the coast. In CINP it occurs on San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on rock, *Knudsen et al. 11425* (UCR).

Lecidella asema (Nyl.) Knoph & Hertel *in* Knoph, Biblioth. Lichenol. 36: 66 (1990). Description: Knoph and Leuckert 2004. Substrate: non-calcareous rock, serpentine, soil, rarely wood. World distribution: Asia, Africa, Europe, North America. CINP distribution: EA, SB, SC, SM, SR, WA.

NOTES. – *Lecidella asema* is the most common species of the genus in central and southern California along the coast, but is also frequent in the mountains of southern California. It is commonly found on soil in coastal biological soil crusts. The species is common on Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Beecher Bay, on rock, *Knudsen 8983* (UCR).

Lecidella carpathica Körber, Parerga Lichen.: 212 (1861). Description: Knoph and Leuckert 2004. Substrate: non-calcareous rock, serpentine, rarely on wood or bark. World distribution: Asia, Europe, North and South America. CINP distribution: SC. SR.

NOTES. – *Lecidella carpathica* is frequent in California and like *L. asema* occurs in variety of habitats. It is infrequent on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, near Sierra Pablo Road, on rock, *Knudsen 8832* (UCR).

Lecidella elaeochroma (Ach.) M. Choisy, Bull. Soc. Linn. Lyon 19: 19 (1950). Description: Knoph and Leuckert 2004. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SC, SM, SR.

NOTES. – *Lecidella elaeochroma* is frequent in California. It is rare in CINP where it occurs on San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on bark, *Ryan 31282.d* (ASU; det. Knoph & Winkler).

Lecidella granulosula (Nyl.) Knoph & Leuckert, Herzogia 14: 9 (2000). Description: Knoph and Leuckert 2004. Substrate: non-calcareous rock, rarely bark or wood. World distribution: Asia, Europe, North America. CINP distribution: SR.

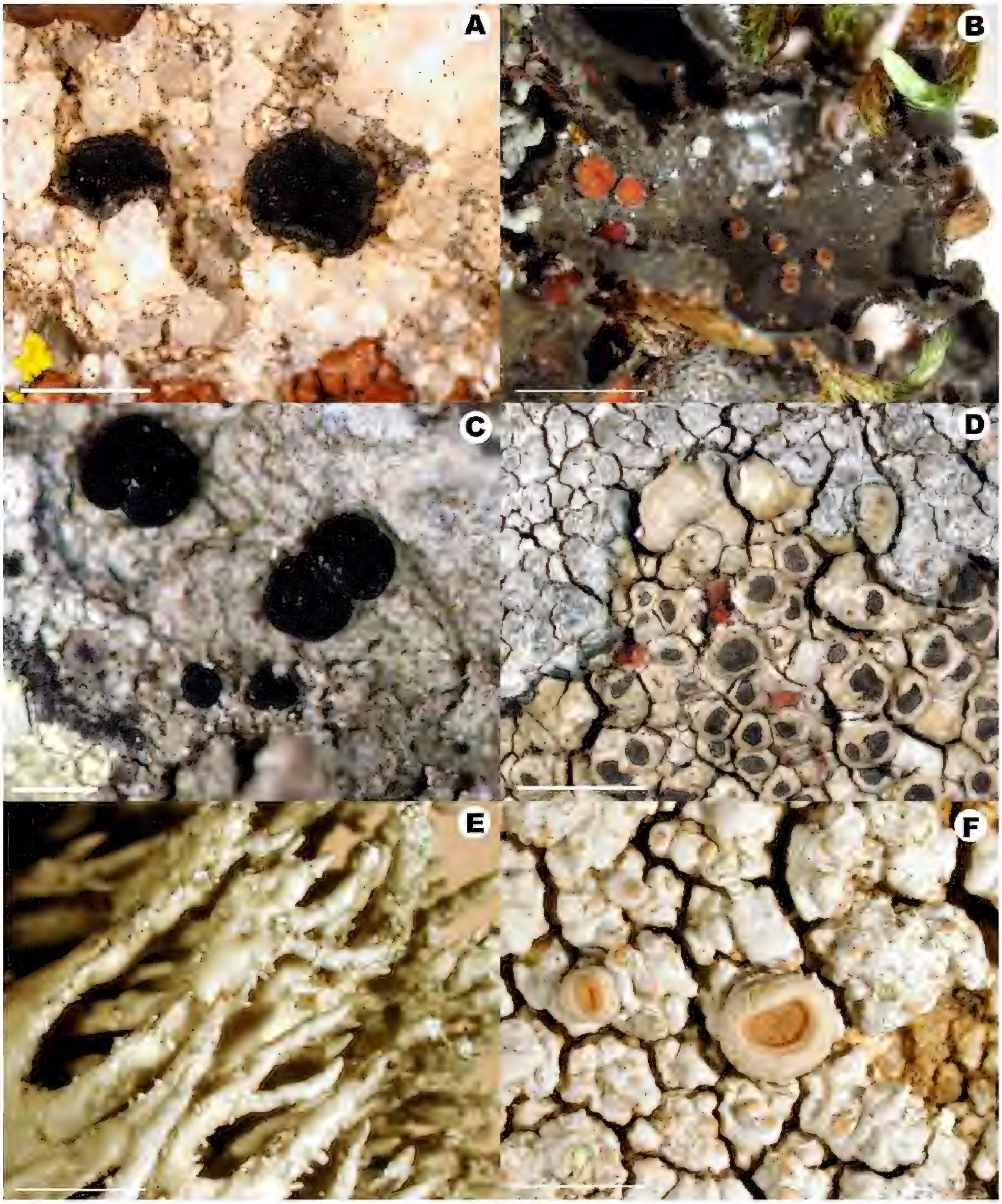

Plate 13, A, *Lecidea laboriosa* (*Knudsen 11410*, UCR). B, *Leptochidium albociliatum* (*Knudsen 794*, UCR). C, *Megalaria columbiana* (*Knudsen 7563.2*, UCR). D, *Mobergia angelica* (*Lendemer 11472*, NY). E, *Niebla isidiaescens* (*Hollinger 4252*, UCR). F, *Ochrolechia subpallescens* (*Knudsen 11426*, UCR). Scales = 1.0 mm in A, B, D-F; 0.5 mm in C.

NOTES. – *Lecidella granulosula* is only known from California on the basis of two collections made on bark or wood on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on fence, *Nash 32995* (ASU; det. Knoph).

Lecidella meiococca (Nyl.) Leuckert & Hertel *in* Leuckert et al., Intrn. Abs. 33/20: 33 (1990). Description: Knoph and Leuckert 2004. Substrate: non-calcareous rock, rarely wood. World distribution: Europe, North America. CINP distribution: SC, SR.

NOTES. – *Lecidella meiococca* is a leprose crust which has not been collected in a fertile state in California. It occurs along the California coast and in CINP occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on fence, *Nash 32995* (ASU; det. Knoph).

Lecidella scabra (Taylor) Hertel, Willdenowia 5: 375 (1969). Description: Knoph and Leuckert 2004. Substrate: non-calcareous rocks. World distribution: Europe, North America.

NOTES. – *Lecidella scabra* is rare on the California coast. It occurs on West Anacapa and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Outhouse Canyon, on consolidated soil, *Knudsen 7638* (UCR).

Lecidella stigmatea (Ach.) Hertel & Leuckert, Willdenowia 5: 375 (1969). Description: Knoph and Leuckert 2004. Substrate: non-calcareous rock, serpentine. World distribution: cosmopolitan. CINP distribution: WA.

NOTES. – *Lecidella stigmatea* is common in California in a variety of habitats. The specimen cited here was originally misidentified and reported as *L. viridans* (Flot.) Körb (see Excluded Species below). It is currently only known from West Anacapa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on basalt, *Nash 32359* (ASU; det. Knudsen).

Lempholemma chalazanum (Ach.) B. de Lesd., Recherch. Lich. Dunkerque: 261 (1910). Description: Schultz 2004. Substrate: soil and overgrowing mosses. World distribution: Asia, Europe, India, North America. CINP distribution: WA.

NOTES. – The cyanolichen *Lempholemma chalazanum* is rare in southern California. In coastal habitats in the Santa Monica Mountains it once formed extensive soil crusts but these appear to have been extirpated. It is known from CINP from a single collection of a small fertile population that occurs on West Anacapa Island.

Voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on soil, *Knudsen 10876* (UCR).

Lepraria lobificans Nyl., Flora 56: 196 (1873). Description: Tønsberg 2004b. Substrate: soil, over bryophytes, on bark. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Lepraria lobificans* is common in California, particularly in central California from Monterey to at least Sonoma Counties. It is also common on Santa Rosa Island and is known from Santa Cruz Island from a single specimen from the Christi Pines area.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on soil, *Knudsen 7660 & Baguskus* (UCR; det. Lendemer).

Lepraria neglecta (Nyl.) Erichsen**,** Flechtenfl. Nordwestdeustchl. 394. 1957. Description: Tønsberg 2002b. Substrate: bark, soil, non-calcareous rock, overgrowing bryophytes. World distribution: Asia, Europe, North America. CINP distribution: SR.

NOTES. – This species is common in California but is surprisingly rare in CINP. In Tønsberg (2002b) and Knudsen and Elix (2007) the chemotypes of this species were referred to as *Lepraria alpina* (B. de Lesd.) Tretiach & Baruffo, *L. borealis* Loht. & Tønsberg, and *L. caesioalba* (B. de Lesd.) J.R. Laundon. The latter was the most commonly used name in recent English language literature. The taxon has a wide variety of chemotypes, which has led to a variety of names based solely on exolites. In CINP it is known from a single collection on Santa Rosa Island.

Voucher. – U.S.A. CALIFORNIA. SANTA BARBARA CO.: Santa Rosa Island, side of Black Mountain, small patch on *Quercus pacifica*, *Knudsen et al. 7684* (UCR; det. Lendemer).

Lepraria xerophila Tønsberg, Lichen Flora of the Greater Sonoran Desert Region, 2: 328 (2004). Description: Tønsberg 2004b. Substrate: soil. World distribution: Europe, North America. CINP distribution: SB, SC, SM, SR, WA.

NOTES. – *Lepraria xerophila* is a distinctive crustose to squamulose species that is common along the coast of California as far north as Point Reyes in Marin County where it is rare. J. Elix and the first author studied the two chemotypes, one common (pannaric acid 6-methly ester) and one only known from the Channel Islands (norascomatic acid, strepsilin) (Tønsberg 2004a). Both chemotypes occur on Santa Rosa Island. The chemotypes occurred in discreet populations but with no real geographic separation. In one case both occurred within ca. 100 meters of each other near Black Mountain. There were no morphological or ecological differences between the chemotypes. This is a common species on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, between Dry Canyon and Verde Canyon, on soil, *Knudsen et al. 10526* (UCR).

Leprocaulon americanum Lendemer & Hodkinson ined.,. Description: McCune and Geiser 2009 (as *L. microscopium*). Substrate: soil, rarely rock or wood. World distribution: North and South America. CINP distribution: SB, SC, SM, SR, WA.

NOTES. – *Leprocaulon americanum* has been known previously as *L. microscopium* (Vill.) Gams *ex* D. Hawks. It is infrequent along the coast from Baja California to Oregon, but often locally abundant, sometimes in biological soil crusts (Hernandez and Knudsen 2012).In early development it forms a leprose crust. It is frequent on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa RosaIsland, Torrey Pine forest, *Knudsen 7432* (NY, UCR).

Leprocaulon knudsenii Lendemer & Hodkinson, ined. Description: Lendemer and Hodkinson in rev. Substrate: non-calcareous rock. World distribution: North America (California endemic). CINP distribution: SC.

NOTES. – The leprose species *Leprocaulon knudsenii* is a California endemic occurring in the mountains of southern and central California. In CINP it is only known from a single collection on Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, canyon from Prisoners Harbor to Stanton Ranch, on boulder, *Knudsen 8582* (NY).

Leprocaulon santamonicae (K. Knudsen & Elix) Lendemer & Hodkinson, ined. Description: Knudsen and Elix 2007. Substrate: soil, rock. World distribution: North America (California endemic). CINP distribution: SR.

NOTES. – The leprose species *Leprocaulon santamonicae* is a California endemic that was originally described from the Santa Monica Mountains. It forms biological soil crusts, especially on eroding vertical soil surfaces. It is known from southern California north to at least Yosemite in the Sierra Nevada Mountains. It is rare on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Torrey Pine forest, on breccia, *Knudsen 7441.1* (UCR; det. Elix).

Leprocaulon terricola (Lendemer) Lendemer & Hodkinson, ined. Description: Lendemer 2010. Substrate: soil. World distribution: North America (California endemic). CINP distribution: SC, SR.

NOTES. – The leprose species *Leprocaulon terricola* is a rare California endemic occurring in coastal biological soil crusts. It was originally described from Santa Rosa Island, where it is known from the type collection, and occurs in the High Mountains on east Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, upper Cherry Canyon, *Knudsen 10606* (NY, UCR; det. Lendemer).

Leptochidium albociliatum (Desm.) M. Choisy, Bull. Mens. Soc. Lyon 21: 165 (1952). Description: McCune and Geiser 2009. Substrate: soil and rocks. World distribution: Europe, North America. CINP distribution: SC.

PLATE 13, FIG. B.

NOTES. – *Leptochidium albociliatum* is frequent throughout California in wide variety of habitats. In southern California it is often locally abundant, or the only cyanolichen in an area. It is rare on the north Channel Islands where it is known from a single population on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, Cañada del Puerto, *Ryan 31602* (ASU; det. Jørgensen)

Leptogium californicum Tuck., Syn. N. Amer. Lich. 1: 159 (1882). Description: Jørgensen and Nash 2004. Substrate: usually on rocks or mosses, sometimes on soil or at the bases of trees. World distribution: North America. CINP distribution: SC.

NOTES. – *Leptogium californicum* is frequent in coastal California as well as in the Sierra Nevada Mountains. There is some taxonomic confusion about this species, with authors unsure if it is a form of *L. gelatinosum* (With.) J.R. Laundon (Jørgensen & Nash 2004) or possibly is indistinct from *L. lichenoides* (L.) Zahlbr. (McCune and Geiser 2009). It is apparently rare on the north Channel Islands where it is known only from Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, Cañada del Puerto, *Nash 32443* (ASU).

Lichinella robustoides Henssen, Budel & Nash, Bryologist 88: 290 (1985). Description: Schultz 2007a. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Lichinella robustoides* is rare in California. It is known from single populations on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, headland W of Coches Prietos, on rock, *Bratt 6263A* (ASU; det. Schultz).

Lichinella stipatula Nyl., Bull. Soc. Linn. Normandie, ser. 2, 6: 301 (1873). Description: Schultz 2007b. Substrate: non-calcareous rock. World distribution: Asia, Africa, Europe, North America. CINP distribution: SC.

NOTES. – *Lichinella stipatula* is frequent throughout California. In CINP it is known from several collections on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, Fraser Point, *Tucker 35740* (SBBG; det. Schultz).

Lichenoconium erodens M.S. Christ. & D. Hawksw. *in* Hawksworth, Persoonia 9: 174 (1977). Description: Diederich 2004a. Substrate: lichens. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – This common anamorphic fungus is parasitic on a wide variety of hosts and is common in California. It occurs on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, on *Hypogymnia mollis, Kocourková & Knudsen s.n.* (PRM 909127).

Lichenoconium lecanorae (Jaap) D. Hawksw., Bull. Br. Mus. Nat. Hist. (Bot.) 6: 270 (1979). Description: Diederich 2004a. Substrate: lichens. World distribution: Asia, Europe, North and South America. CINP distribution: SR.

NOTES. – *Lichenoconium lecanorae* is usually found on the apothecia of *Lecanora* and *Parmelia* species, and is frequent in California (Kocourková et al. 2012). It occurs on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, on *Niebla homalea*, *Kocourková & Knudsen s.n.* (PRM 909707).

Lichenoconium lichenicola (P. Karst.) Petr. & Sydow, Die Gattungen der Pyrenomyzeten Sphaeropsideen und Melanconieen. 1. Die phaeosporen Sphaeropsideen und die Gattung Macrophoma: 432 (1927). Description: Cole and Hawksworth 2004. Substrate: *Physcia* species. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – *Lichenoconium lichenicola* was collected in California on *Physcia* species (Kocourková et al. 2012). It occurs on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, on *Physcia* species, *Kocourková & Knudsen s.n.* (PRM 909120).

Lichenodiplis lecanorae (Vouaux) Dyko & D. Hawksw. *in* Hawksworth & Dyko, Lichenologist 11: 52 (1979). Description: Diederich 2004b. Substrate: *Caloplaca* and *Lecanora* species. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Lichenodiplis lecanorae* occurs mostly on the apothecia of *Caloplaca* and *Lecanora* species and is probably frequent in California (Kocourková et al. 2012). It occurs on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, on *Lecanora caesiorubella*, *Kocourková & Knudsen s.n.* (PRM 914996).

Lichenodiplis lecanoricola (M.S. Cole & D. Hawksw.) Diederich, Herzogia 16: 61 (2003). Description Diederich 2004b. Substrate: *Caloplaca* and *Lecanora* species. World distribution: North America. CINP distribution: SR.

NOTES. – *Lichenodiplis lecanorae* mostly occurs on the apothecia of *Lecanora* species on bark and is probably frequent in California (Kocourková et al. 2012). It occurs on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, on *Lecanora caesiorubella*, *Kocourková & Knudsen s.n.* (PRM 914996).

Lichenostigma amplum Calat. & Hafellner, Lichen Flora of the Great Sonoran Desert Region 2: 665 (2004). Description: Calatayud et al. 2004. Substrate: *Buellia* species. World distribution: North America. CINP distribution: SR.

NOTES. – The lichenicolous fungus *Lichenostigma amplum* occurs on *Buellia* species and is probably frequent along the southern and central California coast. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on *Buellia sequax, Knudsen 7606.2* (UCR)

Lichenostigma bolacinae Nav.-Ros., Calat. & Hafellner, Lichen Flora of the Great Sonoran Desert Region 2: 665 (2004). Description: Calatayud et al. 2004. Substrate: *Caloplaca bolacina*. World distribution: North America. CINP distribution: SR.

NOTES. – The lichenicolous fungus *Lichenostigma bolacinae* is probably frequent along the southern California coast. It is frequent on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, above Water Canyon, on *C. bolacina, Kocourková & Knudsen s.n.* (PRM 909668, UCR)

Lichenostigma cosmopolites Hafellner & Calat., Mycotaxon 72: 108 (1999). Description: Calatayud et al. 2004. Substrate: *Xanthoparmelia* species. World distribution: cosmopolitan CINP distribution: SC, SR.

NOTES. – *Lichenostigma cosmopolites* is common on *Xanthoparmelia* species in California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on *Xanthoparmelia* species, *Knudsen 10598.1* (UCR).

Lichenostigma radicans Calatayud & Barreno, Lichenologist 35: 279 (2003). Description: Calatayud and Barreno 2003. Substrate: *Aspicilia* species. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – *Lichenostigma radicans* occurs on *Aspicilia* species and is known from North America on the basis of a single collection from Santa Rosa Island. That voucher requires further study.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: on *Aspicilia pacifica, Knudsen et al. 8778.2* (PRM 909683, UCR).

Lichenostigma rugosum Thor, Lichenologist 17: 269 (1985). Description: Calatayud et al. 2004. Substrate: *Diploschistes* species. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Lichenostigma rugosum* is probably frequent in California. It is infrequent on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, South Point, on *Diploschistes diacapsis, Knudsen 11412 & Chaney* (UCR).

Lichenostigma subradians Hafellner, Calat. & Nav.-Ros., Mycol. Res. 106: 1239 (2002). Description: Calatayud et al. 2004. Substrate: *Diploschistes* species. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Lichenostigma subradians* is common in California, especially on the yellow species *Acarospora socialis*. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Torrey Pine grove, on *Acarospora socialis*, *Knudsen 7464* (UCR).

Marchandiomyces corallinus (Roberge) Diederich & D. Hawksw. *in* Diederich, Mycotaxon 37: 312 (1990). Description: Diederich 1990. Substrate: lichens. World distribution: Asia, Europe, North and South America. CINP distribution: SR.

NOTES. – The lichenicolous fungus *Marchandiomyces corallinus* occurs on many different hosts but appears to be rare in southern California. It is expected to occur in northern California and is currently known in California from a single collection from Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Burma Road, on *Teloschistes chrysophthalmus, Kocourková & Knudsen s.n.* (PRM 909661, UCR).

Maronea polyphaea H. Magn., Acti Horti Gothob. 9: 59 (1934). Description: Harris 2006. Substrate: bark. World distribution: North America. CINP distribution: SC.

NOTES. – *Maronea polyphaea* is rare in California. The H.E. Hasse collections from Santa Monica Mountains lacked exolites (LaGreca 2006). Harris (2006) considered the Hasse specimens to potentially represent a taxon new to science and should be further studied. Two specimens from Santa Cruz Island were not apparently tested for exolites. It is not known if they are conspecific with the collections from the Santa Monica Mountains. The species is rare on Santa Cruz Island and known from a single population.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, Islay Canyon Road, on bark, *Bratt 3110* (SBBG; det. Nash).

Megalaria columbiana (G. Merr.) Ekman *in* Ekman et al., Bryologist 99: 39 (19996). Description Ekman and Tønsberg 1999. Substrate: bark. World distribution: North America. CINP distribution: SR.
PLATE 13, FIG. C.

NOTES. – *Megalaria columbiana* occurs on the central California coast, especially in Marin County. In CINP it is known from a single collection from Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on *Quercus agrifolia, Knudsen 7563.3* (UCR; det. Lendemer).

Micarea denigrata (Fr.) Hedl., Bih. K. Svenska Vet-Akad. Handl. ser. 3, 18: 78. (1892). Description Czarnota 2007; Fryday and Coppins 2007. Substrate: bark, rock. World distribution: Asia, Europe, North America. CINP distribution: SC, SR, EA.

NOTES. – *Micarea denigrata* is infrequent in southern California. It is also infrequent in CINP where it occurs on East Anacapa, Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. VENTURA CO.: East Anacapa Island, on branches of *Rhus integrifolia*, *Knudsen 10904* (UCR).

Micarea nitschkeana (J. Lahm *ex* Rabenh.) Harm., Bull. Soc. Sci. Nancy, ser. 2, 33: 64 (1899). Description Czarnota 2007; Fryday and Coppins 2007. Substrate: bark, wood. World distribution: Europe, North America. CINP distribution: SM.

NOTES. – *Micarea nitschkeana* is infrequent along the central coast of California. It is known from a single collection from San Miguel Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, on wood log, *Tønsberg 25364* (ASU; det. Fryday).

Mobergia angelica (Stizenb. *ex* Hasse) H. Mayrhofer & Sheard, Bryologist 95: 439 (1992). Description Mayrhofer and Sheard 2004b. Substrate: calcareous and non-calcareous rock, rarely soil. World distribution: Europe, America. CINP distribution: SB, SC, SM, SR, WA.

PLATE 13, FIG. D.

NOTES. – *Mobergia angelica* is common along the central and southern California coast. It occurs on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. VENTURA CO.: San Miguel Island, Green Mountain, on rock, *Knudsen 6781* (UCR).

Moelleropsis nebulosa (Hoffm.) (Hoffman) Gyelnik *in* Rabenh., Krypt. Flora 9, 2: 257 (1940). Description: Jørgensen 2002b. Substrate: soil. World distribution: Africa, northern hemisphere. CINP distribution: SC.

NOTES. – *Moelleropsis nebulosa* is a leprose cyanolichen that is apparently rare in California. It is known from a single collection from Santa Cruz Island

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Cruz Island, *Weber & Bratt s.n.* (ASU).

***Muellerella lichenicola** (Sommerf.) D. Hawksw., Bot. Not. 132: 289 (1979). Description: Triebel and Kainz 2004. Substrate: variety of lichens. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – The lichenicolous fungus *Muellerella lichencola* is probably frequent along the central coast. It occurs on *Lecanora* species on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, on *Lecanora* species, *Nash 32710* (ASU; det. Triebel).

†*Mycocalicium subtile* (Persoon) Szatala, Magyar Bot. Lapok 24: 47 (1926). Description: Tibell 2007. Substrate: saprobic on dry wood. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – The non-lichenized fungus *Mycocalicium subtile* is common in California in a wide variety of habitats. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on dry wood of *Quercus pacifica, Knudsen et al. 7688* (UCR).

†*Mycocalicium victoriae* (C. Knight *ex* F. Wilson) Nádv., Ann. Mycol. 40: 138 (1942). Description: Tibell 2007. Substrate: saprobic on dry wood. World distribution: Australia, Europe, North America. CINP distribution: SC.

NOTES. – The non-lichenized fungus *Mycocalicium victoriae* is known in California only from Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO. Santa Cruz Island, south of Prisoners Harbor, on *Quercus agrifolia*, *Nash 32497* (ASU; det. Tibell).

Myriospora hassei (Herre) K. Knudsen & L. Arcadia, Opuscula Philolichenum 11: 21 (2012).Description: Knudsen 2011 (as *Silobia hassei*). Substrate: non-calcareous rock. World distribution: Europe, North America. CINP distribution: SR.

PLATE 20, FIG. F.

NOTES. – *Myriospora hassei* is infrequent along the California coast from Point Reyes to San Diego. It occurs on Santa Rosa Island in CINP.

Selected voucher. – U.S.A. CALIFORNIA. SANTA BARBARA CO.: Santa Rosa Island, Burma Road, on sandstone, *Knudsen 8713.2 & Kocourková* (UCR).

Myriospora scabrida (Hedl. *ex* H. Magn.) K. Knudsen & L. Arcadia, Opuscula Philolichenum 11: 22 (2012). Description: Knudsen 2007a; Westberg et al. 2011 (as *Silobia scabrida*). Substrate: non-calcareous rock, rarely soil. World distribution: Europe, North America. CINP distribution: SC.

NOTES. – *Myriospora scabrida* appears to be infrequent but widespread in California in a variety of habitats. It is rare on Santa Cruz Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on rock, *Knudsen 11875* (UCR).

†***Naetrocymbe punctiformis*** (Pers.) R.C. Harris, More Florida Lichens: 63 (1995). Description: Aptroot 2002 (as *Arthopyrenia punctiformis*). Substrate: bark. World distribution: cosmopolitan. CINP distribution: WA.

NOTES. – The non-lichenized fungus *Naetrocymbe punctiformis* is infrequent in California. It occurs on West Anacapa Island in CINP. The rare lichenized species *N. herrei* K. Knudsen & Lendemer (Knudsen and Lendemer 2009) occurs on sea cliffs in San Simeon and San Francisco and may occur in CINP.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: West Anacapa Island, on *Rhus integrifolia, Knudsen 10892* (UCR).

Nephroma parile (Ach.) Ach., Lich. Univ.: 522 (1810). Description: Wetmore and Nash 2002. Substrate: usually on non-calcareous rock. World distribution: Asia, Europe, North and South America. CINP distribution: SR.

NOTES. – The sorediate species *Nephroma parile* is rare in northern California. It is only known in southern California from a single collection that was made on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Soledad Grove, on *Quercus tomentella*, *Kocourková & Knudsen s.n.* (UCR).

Niebla cephalota (Tuck.) Rundel & Bowler, Mycotaxon 6: 498 (1978). Description: Bowler and Marsh 2004. Substrate: bark, rarely rock. World distribution: North and South America. CINP distribution: EA, SB, SC, SM, SR, WA.

NOTES. – *Niebla cephalota* and *N. ceruchis* are the common *Niebla* species on bark in CINP and can both easily be recognized by sight. They also often grow together. *Niebla cephalota* is the only sorediate species in the genus. It is common along the California coast from the Santa Monica Mountains north. It is common on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Bee Canyon, on rock, *Knudsen et al. 10530* (UCR).

Niebla ceruchis (Ach.) Rundel & Bowler, Mycotaxon 6: 498 (1978). Description: Bowler and Marsh 2004. Substrate: bark, rarely rock. World distribution: North and South America. CINP distribution: EA, SB, SC, SM, SR, WA.

NOTES. – *Niebla ceruchis* is frequent in California from San Diego north to Monterey County. On the Channel Islands it is especially common on *Baccharis.* On San Miguel Island it is used for nesting material by Allen's Hummingbirds in Willow Canyon. It is known from all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Dry Canyon, on *Baccharis*, *Knudsen et al. 10534* (UCR).

Niebla ceruchoides Rundel & Bowler, Phytologia 77: 26 (1994). Description: Bowler and Marsh 2004. Substrate: rock, rarely soil. World distribution: North America. CINP distribution: SB, SC, SM, SR, WA.

NOTES. – *Niebla ceruchoides* is infrequent in California from San Luis Obispo County south, but locally abundant. It occurs on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Barbara Island, on rock, *Bratt 4813* (SBBG).

Niebla combeoides (Nyl.) Rundel & Bowler, Mycotaxon 6: 499 (1978). Description: Bowler and Marsh 2004. Substrate: rock. World distribution: North America. CINP distribution: SB, SC, SM, SR, WA.

NOTES. – *Niebla combeoides* is rare along the California coast as far north as Marin County. It occurs on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Twin Faults, *Marsh 6835* (ASU).

Niebla homalea (Ach.) Rundel & Bowler, Mycotaxon 6: 499 (1978). Description: Bowler and Marsh 2004. Substrate: bark, rock, soil. World distribution: North America. CINP distribution: EA, SB, SC, SM, SR, WA.

NOTES. – *Niebla homalea* is the most common species of the genus in coastal California, but it is quite variable in form. It occurs on all of the Channel Islands.

*Selected voucher***. – U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Sierra Blanca ridge, on rock, *Marsh 5818* (ASU).

Niebla isidiaescens Bowler, Marsh, Nash & Riefner, Phytologia 77: 29 (1994). Description: Bowler and Marsh 2004. Substrate: rock. World distribution: North America. CINP distribution: EA, SB, SC, WA.

PLATE 13, FIG. E.

NOTES. – *Niebla isidiaescens* is a rare species along the California coast, known from Conejo Mountain in the Santa Monica Mountains and Morro Bay. It is rare on the north Channel Islands, known from Anacapa, Santa Barbara, and Santa Cruz Islands.

*Selected voucher***. – U.S.A. CALIFORNIA.** VENTURA CO.: East Anacapa Island, on volcanic rock, *Knudsen 10741* (UCR).

Niebla laevigata Bowler & Rundel, Phytologia 77: 31 (1994). Description: Bowler and Marsh 2004. Substrate: rock. World World distribution: North America. CINP distribution: EA, SB, SC, SM, SR, WA

NOTES. – *Niebla laevigata* occurs from central California to Baja California. It occurs on all of the Channel Islands and is especially common on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. VENTURA CO.: East Anacapa Island, on rock, *Knudsen 10739* (UCR).

Niebla polymorpha Bowler, J.E. Marsh, T.H. Nash, & Riefner, Phytologia 77: 33 (1994). Description: Bowler and Marsh 2004. Substrate: rock. World distribution: North America. CINP distribution: EA, SC.

NOTES. – *Niebla polymorpha* is more frequent along the coast of Baja California in Mexico than the coast of California. In California, it is only known from the Channel Islands and Morro Bay in San Luis Obispo County. It is infrequent on East Anacapa and Santa Cruz Islands, but may be frequent on steep inaccessible sea cliffs on all the islands.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: East Anacapa Island, on rock, *Knudsen 5328* (UCR).

Niebla procera Rundel & Bowler, Phytologia 77: 34 (1994). Description: Bowler and Marsh 2004. Substrate: rock. World distribution: North America. CINP distribution: SB, SC, SM, SR.

NOTES. – *Niebla procera* is endemic to the coast of Mexico and California. It occurs on San Miguel, Santa Barbara, Santa Cruz, and Santa Rosa Islands in CINP. It probably also occurs on the cliffs of Anacapa Island but has not yet been found there.

Selected voucher. – **U.S.A. CALIFORNIA.** : SANTA BARBARA CO.: San Miguel Island, on rock, *Marsh 7895* (ASU).

Niebla robusta (R.H. Howe) Rundel & Bowler, Mycotaxon 6: 499 (1978) Description: Bowler and Marsh 2004. Substrate: rock. World distribution: North America. CINP distribution: EA, SB, SC, SM, SR, WA

NOTES. – *Niebla robusta* is endemic to the coast of Baja California and California. It occurs on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, above Fraser Point, *Marsh 7048* (ASU).

Normandina pulchella (Borrer) Nyl., Ann. Sci. Nat. Bot., sér. 4, 15: 382 (1861). Description: Tønsberg 2004c. Substrate: bark, rock, other lichens, moss. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Normandina pulchella* is infrequent in California but is probably undercollected and can occur in a variety of habitats. It is known from Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA. SANTA BARBARA CO.:** Santa Cruz Island, west end of Central Valley, *Robertson 1469* (SBBG).

Ochrolechia africana Vain., Ann. Univ. Fenn. Aboënsis Ser. A2: 3 (1926). Description: Roemer et al. 2004. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Ochrolechia africana* is part of the subtropical element in the California lichen biota. It occurs along the coast of California where it is infrequent. In CINP it occurs on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on *Quercus agrifolia, Nash 32946b* (ASU).

Ochrolechia arborea (Kreyer) Almb., Bot. Not. 254 (1952). Description: Roemer et al. 2004; Kukwa 2011; Brodo and Lendemer 2012. Substrate: bark. World distribution: Europe, North America. CINP distribution: SC.

NOTES. – *Ochrolechia arborea* is infrequent in California on the southern and central coast. It is known from Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, west end of Central Valley, on pine, *Bratt 3496* (SBBG; det. Tønsberg.)

Ochrolechia mexicana Vainio, Dansk Bot. Ark. 4: 9 (1926). Description: Roemer et al. 2004. Substrate: bark. World distribution: Central, North and South America. CINP distribution: SC.

NOTES. – *Ochrolechia mexicana* is rare in California, and is known only from the central coast. In CINP it is rare on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, along ridge to Ragged Mountain, on *Heteromeles arbutifolia*, *Nash 32310* (ASU).

Ochrolechia subpallescens Verseghy, Beih. Nova Hedwigia 1: 118 (1962). Description: Rohmer et al. 2004. Substrate: bark, rarely rocks. World distribution: Asia, Australia, North and South America. CINP distribution: SR.

PLATE 13, FIG. F.

NOTES. – *Ochrolechia subpallescens* is the most common species of the genus in California and usually occurs on oaks. In CINP it occurs on Santa Rosa Island on chaparral and on rock (see *O.* aff. *parella* (L.) A. Massal under “Excluded Species” below).

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, South Point, on rock, *Knudsen 11426 & Chaney* (UCR; verif. Kukwa).

Opegrapha anomea Nyl., Act. Soc. Linn. Bordeaux 21: 399 (1857). Description: Ertz and Egea 2007. Substrate: *Pertusaria* species. World distribution: Africa, Europe, North and South America. CINP distribution: SC, SR.

NOTES. – *Opegrapha anomea* is lichenicolous on *Pertusaria amara* in California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, below Black Mountain, on *Pertusaria amara, Nash 32588* (ASU; det. Ertz).

Opegrapha herbarum Mont., Guillem. Arch. Bot. 2: 302 (1833). Description: Ertz and Egea 2007. Substrate: conifer needles, bark, consolidated soil, rock. World World distribution: cosmopolitan. CINP distribution: EA, SB, SC, SM, SR, WA.

PLATE 14, FIG. A.

NOTES. – *Opegrapha herbarum* is the most common species of the genus in California, especially along coast from Santa Barbara County north. It is even foliicolous on the needles *Picea sitchensis* (Bong.) Carr along the northern California and Oregon coast (Villella & Carlberg 2011). The taxon occurs on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Outhouse Canyon, on consolidated soil, *Knudsen 7637* (UCR)

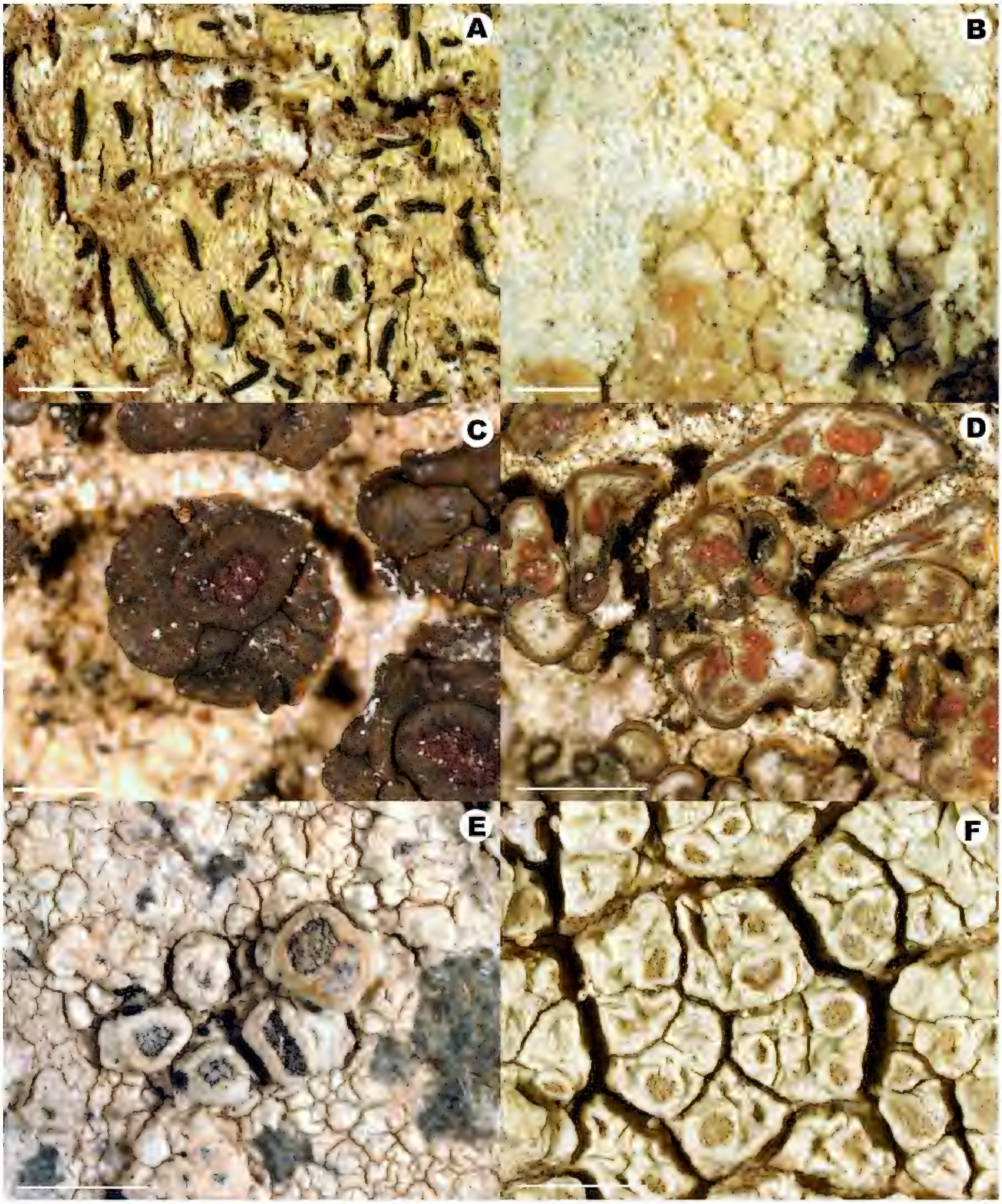

Plate 14, A, *Opegrapha herbarum* (*Knudsen 10250*, UCR). B, *Paraschismatomma ochroleucum* (*Knudsen 10033*, UCR). C, *Peltula obscurans* var. *hassei* (*Knudsen 11180*, UCR). D, *Peltula patellata* (*Knudsen 11176*, UCR). E, *Pertusaria brattiae* (*Knudsen 9639*, UCR). F, *Pertusaria flavicunda* (*Knudsen 10632*, UCR). Scales = 1.0 mm in A, D-F; 0.5 mm in B, C.

Opegrapha niveoatra (Borrer) J.R. Laundon, Lichenologist 2: 138 (1963). Description: Ertz and Egea 2007. Substrate: bark. World distribution: Asia, Africa, Europe, North America. CINP distribution: SC.

NOTES. – *Opegrapha niveoatra* definitely prefers humid habitats and has been most frequently collected in Monterey and Santa Cruz Counties in California, where it is rare. In CINP it is known from a single collection made on Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA. SANTA BARBARA CO.:** Santa Cruz Island, Christy Ranch, on Monterey cypress, *Tucker 35745* (SBBG; det. Ertz).

Opegrapha vulgata (Ach.) Ach., Meth. Lich.: 20 (1803). Description: Ertz and Egea 2007. Substrate: bark. World World distribution: Africa, Australia, Europe, North America. CINP distribution: SC, SR.

NOTES. – *Opegrapha vulgata* is common from the Channel Islands north along the central coast of California. Here we cite the authority of this name as (Ach.) Ach. following a conservation proposal for *Lichen vulgatus* Ach. (Arcadia and Ertz 2012). The species occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, below Black Mountain, on *Quercus agrifolia*, *Nash 32610* (ASU; det. Ertz).

Paraschismatomma ochroleucum (Zahlbr.) K. Knudsen, Ertz & Tehler *in* Ertz & Tehler, Fungal Diversity 49: 57 (2011) Description: Tehler 2002c (as "*Schismatomma pluriloculare*"). Substrate: bark and wood. World distribution: North America. CINP distribution: SB (historical).

PLATE 14, FIG. B.

NOTES. – *Paraschismatomma ochroleucum* occurs along the central coast of California. It once occurred on Santa Barbara Island based on a B. Trask collection from 1902, but it now appears to be extirpated. The species is often sterile. We expect to occur at least on Santa Cruz Island, although it has not yet been found there. Interestingly this is currently the only documented example we have from CINP of an extirpated lichen species.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Barbara Island, 1902, *Trask s.n.* (FH).

Parmelia sulcata Taylor, Fl. Hibern. 2: 145 (1836). Description: McCune and Geiser 2009. Substrate: bark, occasionally rock. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Parmelia sulcata* is common in California, including the coastal ranges of southern California. But many specimens are proving to actually be referrable to *P. barrenoae* Divakar, M.C. Molina & A. Crespo (Hodkinson et al. 2010). Specimens from the islands need to be revised in light of this discovery. *Parmelia sulcata* occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, along road to East Point, on *Quercus pacifica*, *Nash 32857* (ASU).

Parmotrema arnoldii (Du Rietz) Hale, Phytologia 28: 335 (1974). Description: Nash and Elix 2002a. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Parmotrema arnoldii* is common in California only on the Channel Islands. It is frequent on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, west end of Central Valley, on *Pinus muricata*, *Nash 32292-A* (ASU).

Parmotrema hypoleucinum (J. Steiner) Hale, Phytologia 28: 336 (1974). Description: Nash and Elix 2002a. Substrate: bark, occasionally on rocks. World distribution: cosmopolitan. CINP distribution: SC, SM, SR, WA.

NOTES. – *Parmotrema hypoleucinum* is frequent along the southern and central coast of California. It occurs on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, below Black Mountain, on *Pinus muricata*, *Knudsen et al. 7560.2* (UCR).

Parmotrema perlatum (Hudson) M. Choisy, Bull. Mens. Soc. Linn. Lyon 21: 174 (1952). Description: Nash and Elix 2002a (as *P. chinense*). Substrate: bark, occasionally on rocks. World distribution: cosmopolitan. CINP distribution: SC, SM, SR, WA.

NOTES. – *Parmotrema perlatum* (syn. *P. chinense* (Osbeck) Hale & Ahti) is common in California, especially on oaks. It occurs on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Burma Road above Arlington Canyon, on soil and rock, *Knudsen et al. 7782.1* (UCR).

Parmotrema reticulatum (Taylor) M. Choisy, Bull. Mens. Soc. Linn. Lyon 21: 175 (1952). Description: Nash and Elix 2002b (as *Rimelia reticulata*). Substrate: bark, rock. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Parmotrema reticulatum* is part of the tropical element of the California lichen biota and occurs on the central coast of California. It is infrequent on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on *Quercus agrifolia, Nash 32944* (ASU).

Parmotrema stuppeum (Taylor) Hale, Phytologia 28: 339 (1974). Description: Nash and Elix 2002a. Substrate: bark, occasionally on rocks. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Parmotrema stuppeum* is common, especially along the central coast of California. It is frequent on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on *Quercus pacifica, Knudsen et al. 8782* (UCR).

Peltigera collina (Ach.) Schrader, J. Bot. 3: 78 (1801). Description: McCune and Geiser 2009. Substrate: among mosses over bark. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – The sorediate *Peltigera collina* is common especially in the mountains of California. It is rare on the Channel Islands, where it is known from only two collections made on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, upper Arlington Canyon, on moss and bark of *Quercus tomentella, Knudsen et al. 7787* (UCR).

Peltula bolanderi (Tuck.) Wetmore, Ann. Mo. Bot. Gard, 57: 168 (1971). Description: Büdel and Nash 2002. Substrate: calcareous and non-calcareous rocks. World distribution: Asia, Africa, Australia, North America. CINP distribution: SB, SR.

NOTES. – *Peltula bolanderi* is widespread in California but easily overlooked or misidentified as *P. euploca*, which is larger and has a less undulate sorediate margin. It occurs on Santa Barbara and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Barbara Island, on rock, *Bratt 4800* (SBBG; det. Wetmore).

Peltula corticola Büdel & R. Sant., Biblioth. Lichenol. 23: 79-80 (1987). Description: Büdel etal. 2007. Substrate: bark. World distribution: Africa, Asia, western North America. CINP distribution: SC.

NOTES. – *Peltula corticola* is known in California from a single collection that was made on Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Islay Canyon Road, on bark, *Bratt 3457* (SBBG; det. Schultz).

Peltula euploca (Ach.) Poelt, Acta Rer. Nat. Mus. Slov. 13: 8 (1967). Description: Büdel and Nash 2002. Substrate: calcareous and non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Peltula euploca* is common throughout California especially in drainages and seeps. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on volcanic rock, *Knudsen 11888.3* (UCR).

Peltula farinosa Büdel, Crypt. Bot. 4: 363 (1994). Description: Büdel and Nash 2002. Substrate: calcareous & non-calcareous rock. World distribution: Asia, Africa, North America. CINP distribution: SC.

NOTES. – *Peltula farinosa* is frequent in Arizona, but is only known in California from two collections made on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Fraser Point, on rock, *Wetmore 74032* (MIN).

Peltula obscurans var. ***deserticola*** (Zahlbr.) Wetmore, Ann. Mo. Bot. Gard. 57: 190 (197). Description: Büdel and Nash 2002. Substrate: usually calcareous rock. World distribution: Asia, North America. CINP distribution: SC, SR.

NOTES. – *Peltula obscurans* var. *deserticola* is infrequent in southern California. It is rare in CINP where it occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Fraser Point, on rock, *Wetmore 74033* (MIN).

Peltula obscurans var. ***hassei*** (Zahlbr.) Wetmore, Ann. Mo. Bot. Gard. 57: 194 (1971). Description: Büdel and Nash 2002. Substrate: calcareous and non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SR, WA.

PLATE 14, FIG. C.

NOTES. – *Peltula obscurans* var. *hassei* is common in California. It is rare on West Anacapa and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on rock, *Knudsen 10834* (UCR).

Peltula omphaliza (Nyl.) Wetmore, Ann. Mo. Bot. Gard. 57: 194 (1971). Description: Büdel and Nash 2002. Substrate: calcereous and non-calcareous rock. World distribution: Australia, Europe, Cape Verde Islands, North America. CINP distribution: SR.

NOTES. – *Peltula omphaliza* is rare in southern California, but because of its small size it is easily overlooked. In CINP it is known from single collection on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Old Ranch Canyon, on rock, *Nash 33105* (ASU).

Peltula patellata (Bagl.) Swinscow & Krog, Norw. J. Bot. 26: 221 (1979). Description: Büdel and Nash 2002. Substrate: soil and rarely sandstone. World distribution: cosmopolitan. CINP distribution: SR.

PLATE 14, FIG. D.

NOTES. – *Peltula patellata* is frequent in southern California where it occurs in biological soil crusts (Hernandez and Knudsen 2012). It is only known from a single collection on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on rock, *Wetmore 73902* (MIN).

Pertusaria amara (Ach.) Nyl., Bull. Soc. Linn. Normandie, sér. 2, 6: 288 (1872). Description: Lumbsch and Nash 2002. Substrate: bark. World distribution: Africa, Asia, Europe, North America. CINP distribution: SC, SR.

NOTES. – The sterile species *Pertusaria amara* is common in California. It is common In CINP where it occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on *Quercus agrifolia*, *Knudsen 7559* (UCR).

Pertusaria brattiae Lumbsch & Nash, Bryologist 102: 218 (1999). Description: Lumbsch and Nash 2002. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SB, SC, SM, SR, WA.

Plate 14, Fig. E.

NOTES. – *Pertusaria brattiae* is infrequent along the coast of California from at least San Luis Obispo County south to California. It occurs on all of the north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on rock, *Knudsen 7560.1* (UCR).

Pertusaria californica Dibben, Milwaukee Publ. Mus. Publ. Biol. Geol. 5: 86 (1980). Description: Lumbsch and Nash 2002. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SR, WA.

NOTES. – *Pertusaria californica* is frequent along the coast of California from San Francisco north. But it is rare in San Mateo County. It is rare on the Channel Islands where it is known only from West Anacapa and Santa Rosa Islands on the basis of three collections.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Brockway Point, on rock, *Knudsen et al. 7743* (UCR).

Pertusaria flavicunda Tuck., Proc. Amer. Acad. Arts & Sci. 12; 176 (1877). Description: Lumbsch and Nash 2002. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SC, SM, SR, WA.

PLATE 14, FIG. F.

NOTES. – *Pertusaria flavicunda* is frequent along the California coast from Santa Barbara County south. It is frequent on the Channel Islands and is often locally abundant. It occurs on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Torrey Pines road, on rock, *Knudsen 7424.1* (UCR).

Pertusaria islandica Bratt, Lumbsch & Schmitt, Lichenologist 38: 411 (2006). Description: Schmitt et al. 2007. Substrate: calcereous and non-calcareous rock. World distribution: North America. CINP distribution: SM.

NOTES. – *Pertusaria islandica* is a rare species. It is only known in California from San Miguel Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, between Caldwell Point and Willow Canyon, on caliche, *Knudsen 6906* (UCR).

Pertusaria lecanina Tuck., Gen. Lich.: 127 (1872). Description: Lumbsch and Nash 2002. Substrate: bark. World distribution: North America. CINP distribution: SC, SR, WA.

NOTES. – *Pertusaria lecanina* is frequent on oaks along the coast of central California south to Baja California. It occurs on West Anacapa, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on wood, *Nash 37085* (ASU; det. Lumbsch).

Pertusaria moreliensis B. de Lesd., Lich. Du Mexique: 18 (1914). Description: Lumbsch and Nash 2002. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SR.

NOTES. – *Pertusaria moreliensis* is a common Mexican species. It is known from California only from a single collection on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, upper Cherry Canyon, on sandstone, *Nash 33124* (ASU; det. Lumbsch).

Pertusaria occidentalis Bratt, Lumbsch & Schmitt, Lichenologist 38: 412 (2006). Description: Schmitt et al. 2007. Substrate: calcareous rock. World distribution: North America. CINP distribution: SM.

PLATE 15, FIG. A.

NOTES. – *Pertusaria occidentalis* is a rare species. It is only known in California from San Miguel Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, San Miguel Hill, on rock, *Knudsen 6787* (UCR).

Pertusaria ophthalmiza (Nyl.) Nyl., Flora 48: 354 (1865). Description: Lumbsch and Nash 2002. Substrate: on bark, wood. World distribution: northern hemisphere. CINP distribution: SC.

NOTES. – *Pertusaria ophthalmiza* can be easily confused with *P. amara* which differs in having KC+ purple soredia while *P. ophthalmiza* has KC- balls of pruina without algal cores that are mistaken for soredia It occurs on Santa Cruz Island, where it is rare, known from two populations.

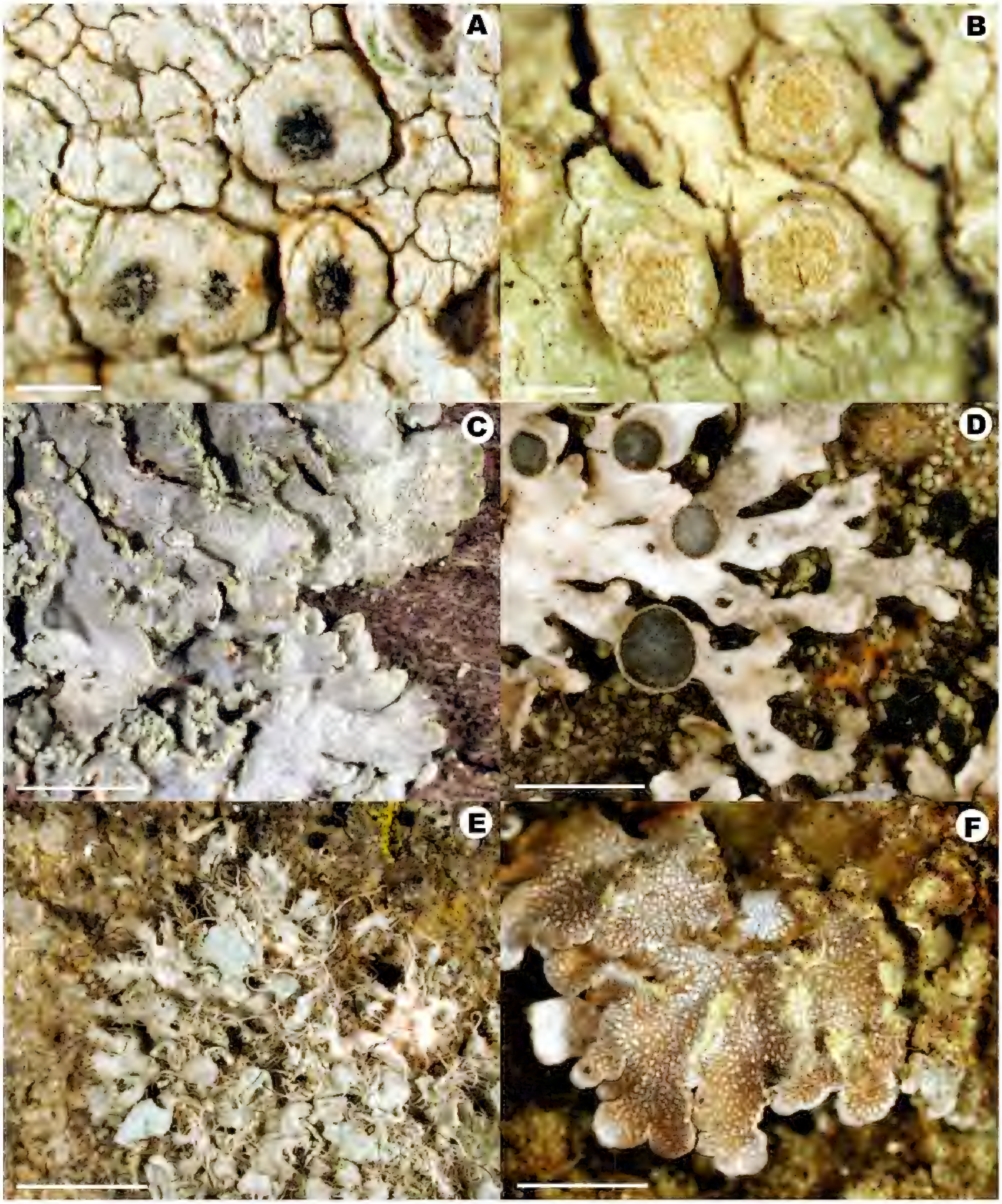

Plate 15, A, *Pertusaria occidentalis* (*Knudsen 6904*, UCR). B, *P. xanthodes* (*Knudsen 10614*, UCR). C, *Physcia dimidiata* (*Knudsen 12972*, NY). D, *Physcia phaea* (*Knudsen 7457*, UCR). E, *Physcia tenellula* (*Knudsen 10560*, UCR). F, *Physconia enteroxantha* (*Lendemer 14727*, NY). Scales = 2.0 mm in E; 1.0 mm in C, F, D; 0.5 mm in A, B.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, 4.5 km from radar station, on bark, *Ryan 31613* (ASU).

Pertusaria rubefacta Erichsen, Rep. Spec. Nov. 35: 387 (1934). Description: Lumbsch and Nash 2002. Substrate: on bark, usually oak. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Pertusaria rubefacta* is frequent along the central coast of California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, upper Cherry Canyon, on *Pinus muricata*, *Knudsen 7675 & Baguskus* (ASU; det. Lumbsch).

Pertusaria tejocotensis B. de Lesd., Lich. Mexique: 18 (191). Description: Lumbsch and Nash 2002. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: SC.

NOTES. – *Pertusaria tejocotensis* is a common Mexican species that is only known from California on the basis of a single collection that was made on Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, 4.5 km from radar station, on rock, *Nash 32452-A* (ASU; det. Lumbsch).

Pertusaria velata (Turner) Nyl., Lich. Scand.: 179 (1861). Description: Lumbsch and Nash 2002. Substrate: bark of oak trees. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Pertusaria velata* is infrequent along the coast of California. It is rare in CINP where it occurs on Santa Rosa Island.

*Selected voucher***.** – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island**,** below Black Mountain, on bark, *Wetmore 73562* (ASU, MIN; det. Lumbsch).

Pertusaria xanthodes Müll. Arg., Flora 67: 286 (1884). Description: Lumbsch and Nash 2002. Substrate: bark. World distribution: Bermuda, North America. CINP distribution: SC, SR.

PLATE 15, FIG. B.

NOTES. – *Pertusaria xanthodes* is frequent along the coast of central and southern California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on dead shrub, *Knudsen 7596* (UCR)

Phaeophyscia hirsuta (Mereschk.) Essl., Mycotaxon 7: 302 (1978). Description: Esslinger 2004a. Substrate: bark, rock. World distribution: Africa, Europe, North America. CINP distribution: SC, SM, SR.

NOTES. – *Phaeophyscia hirsuta* is common in California. In the southern part of the state the thallus is often reduced when occurring on rock and thus easily overlooked. It is common on Santa Cruz Island and also occurs on San Miguel and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, Green Mountain, on rock, *Knudsen 6780* (UCR).

Phaeosporobolus usneae D. Hawksw. & Hafellner, Nova Hedwigia 43: 526 (1986). Description: Diederich 2004c. Substrate: on a variety of epiphytic macrolichens. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – The anamorphic fungus *Phaeosporobolus usneae* is frequent on macrolichens, especially in northern California. It is known from Santa Cruz Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, on *Ramalina subleptocarpha*, *Bratt 5697* (SBBG; det. Diederich).

Phlyctis speirea G. Merr., Ottawa Nat. 27: 118 (1913). Description: Tønsberg 2004d. Substrate: bark. World distribution: North America. CINP distribution: SC?.

NOTES. – *Phylctis speirea* is rare in California. H.E. Hasse collected it in Rustic Canyon and at the top of Santa Ynez Canyon on smooth oak bark in Santa Monica Mountains, where it has probably been extirpated by frequent fires. Tønsberg reported it from the Channel Islands without citing a specimen (Tønsberg 2004c). Two specimens from Santa Cruz Island identified as *P. speirea* at SBBG need to be verified. The sorediate species *P. argena* (Spreng.) Flot. possibly occurs on the islands.

No voucher specimens were seen for this study.

****Phoma cladoniicola*** Diederich, Kocourk, & Etayo *in* Diederich et al., Lichenologist 39: 157 (2007). Description: Diederich et al.2007. Substrate: *Cladonia* species. World distribution: Europe, North America. CINP distribution: WA.

NOTES. –The anamorphic fungus *Phoma cladoniicola* is known from southern California where it is parasitic on *Cladonia chlorophaea*, but so far has not been discovered on any of the endemic species *C. hammeri*, *C. nashii* and *C. maritima.* It occurs on West Anacapa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: West Anacapa Island, Summit Peak, on *Cladonia chlorophaea*, *Knudsen 10868* (UCR)

Physcia adscendens (Fr.) H. Olivier, Flore analytique et dichotomique des lichens de l'Orne I: 79 (1882). Description: McCune and Geiser 2009. Substrate: bark, rock. World distribution: cosmopolitan. CINP distribution: SB, SC, SR.

NOTES. – *Physcia adscendens* is one of the most common lichens throughout California. It occurs on Santa Barbara, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, above the Army Road, on *Artemisia californica*, *Knudsen 7401.2 & Baguskus* (UCR).

Physcia aipolia (Ehrh. *ex* Humb.) Furnr., Flora Ratisbonensis Naturhistorische Topographie von Regensburg 2: 249 (1839). Description: Moberg 2002b. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SB, SC, SR

NOTES. – *Physcia aipolia* is common in California. It is infrequent on Santa Barbara, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Twin Faults, on bark, *Ryan 31238* (ASU).

Physcia biziana (A. Massal) Zahlbr., Österr. Bot. Zeitschr. 51: 348 (1901). Description: Moberg 2002b. Substrate: on bark and usually non-calcareous rock in California. World distribution: cosmopolitan. CINP distribution: SR.

NOTES**.** – *Physcia biziana* is common in California. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island**,** Upper Lobo Canyon, on rock, *Knudsen et al. 8919* (UCR).

Physcia dimidiata (Arnold) Nyl., Flora 64: 537 (1881). Description: Moberg 2007b; McCune and Geiser 2009. Substrate: non-calcareous rock, occasionally on wood. World distribution: cosmopolitan. CINP distribution: SC, SR.

PLATE 15, FIG. C.

NOTES. – *Physcia dimidiata* is common especially in southern California from the coast to the Mojave Desert, where it grows on juniper wood. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Scorpion Canyon, on volcanic boulder, *Knudsen 11889.1* (UCR).

Physcia millegrana Degel., Ark. Bot. 30A1: 56 (1940). Description: Hinds and Hinds 2007. Substrate: bark. World distribution: North America. CINP distribution: SR.

NOTES. – *Physcia millegrana* is especially common in eastern North America. The only report from California is a single collection that was made on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, along road to East Point, on *Quercus pacifica*, *Nash 32860* (ASU; det. Moberg).

Physcia neglecta Moberg, Symb. Bot. Ups. 32: 176 (1997). Description: Moberg 2002b. Substrate: non-calcareous rock, occasionally bark. World distribution: North America. CINP distribution: SR.

NOTES. – *Physcia neglecta* is a non-sorediate Mexican species. It is only known from California with certainty on the basis of a single collection that was made on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, road to East Point, on *Quercus pacifica*, *Nash 32601-B* (ASU; det. Moberg).

Physcia phaea (Tuck.) J.W. Thomson, Beih. Nova Hedwigia 7; 54 (1963). Description: Moberg 2002b. Substrate: non-calcareous rocks. World distribution: Asia, Africa, Europe, North America. CINP distribution: EA, SB, SC, SR, WA.

PLATE 15, FIG. D.

NOTES. – *Physcia phaea* is apparently rare in California, except at lower elevations along the coast in the southern part of the state. It occurs on Anacapa, Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: East Anacapa Island, on basalt, *Knudsen 10924* (UR)

Physcia subtilis Degel., Ark. Bot. 30A: 72 (1941). Description: Hinds and Hinds 2007. Substrate: rock. World distribution: North America. CINP distribution: SR.

NOTES. – *Physcia subtilis* is a common North American species that is only known in California from a single collection that was made on Santa Rosa Island. It is interesting that the two disjunct locations of *P. millegrana* and *P. subtilis* are relatively close together on Santa Rosa Island. Both of these taxa need to be revised (Esslinger, pers. comm.)

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, San Pablo Ridge, on rock, *Nash 32814* (ASU; det. Moberg).

Physcia tenellula Moberg, Symb. Bot. Upsal. 32: 181 (1997). Description: Moberg 2002b. Substrate: non-calcareous rock, occasionally bark. World distribution: North America. CINP distribution: SB, SC, SR, WA.

PLATE 15, FIG. E.

NOTES. – *Physcia tenellula* is a coastal species that occurs from Santa Barbara County to Baja California. Identifications of *P. tenella* (Scop.) DC. from the islands generally refer to this species. *Physcia tenella* is usually a montane species in California but may also occur on the Channel Islands. *Physcia tenellula* occurs on Anacapa, Santa Barbara, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on volcanic rock, *Knudsen 11885* (UCR).

Physcia tribacia (Ach.) Nyl., Flora 57: 307 (1874). Description: Moberg 2002b. Substrate: non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SB, SC, SR.

NOTES. – *Physcia tribacia* is common in California. It occurs on Santa Barbara, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Quemada Canyon, on rock, *Knudsen 8686 & Kocourková* (UCR).

Physcia undulata Moberg, Nord. J. Bot. 6: 861 (1986). Description: Moberg 2002b. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Physcia undulata* is primarily a Mexican species. It is only known from California from a single collection that was made on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on *Quercus agrifolia*, *Nash 32934* (ASU; det. Moberg).

Physconia enteroxantha (Nyl.) Poelt, Nova Hedwigia 12: 125 (1966). Description: Esslinger 2002a. Substrate: bark, rock. World distribution: Asia, Africa, Europe, North America. CINP distribution: SC, SM, SR, WA.

PLATE 15, FIG. F.

NOTES. – *Physconia enteroxantha* is common in California. It occurs on West Anacapa, Santa Cruz, San Miguel, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, lower Willow Canyon, on sandstone, *Nash 41308* (ASU; det. Esslinger).

Physconia fallax Essl., Bull. Calif. Lichen Society 7: 4 (2000). Description: Esslinger 2002a. Substrate: bark, rock. World distribution: North America. CINP distribution: SR.

NOTES**.** – *Physconia fallax* is common in California. In CINP it is known from a single collection that was made on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, upper Arlington Canyon, over moss on bark of *Quercus tomentella, Knudsen et al. 7771* (UCR).

Physconia isidiigera (Zahlbr. *ex* Herre) Essl., Mycotaxon 51: 94 (1994). Description: Esslinger 2002a. Substrate: bark, rock. World distribution: North America. CINP distribution: SC, SM, SR, WA.

NOTES**.** – *Physconia isidiigera* is common in California. In many areas it is especially abundant on rock. It occurs on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Rosa Island, along Wreck Road, on *Heteromeles arbutifoli*a, *Knudsen 7517 & Baguskus* (UCR).

Placidium boccanum (Servít) Breuss, Ann. Naturhist. Mus. Wien 98: 38 (1996). Description: Prieto et al. 2010. Substrate: non-calcareous rock. World distribution: Europe, North America. CINP distribution: SC, SR.

PLATE 22, FIG. A.

NOTES. – *Placidium boccanum* was described from Croatia and was recently reported from the Iberian Peninsula in Europe (Prieto et al. 2010). The species is here repored new for California and North America from CINP where it is is rare on Santa Rosa Island, known from a single collection determined by O Breuss.

Voucher. – **U.S.A. CALIFORNIA**. SANTA BARBARA CO.: Santa Rosa Island, Clapp Springs Road: north-facing slope near Yellow Peak, on shale, *Knudsen 10455.2 & Chaney* (LI, UCR; det. Breuss).

Placidium squamulosum (Ach.) Breuss, Ann. Naturhist. Mus. Wien 98: 39 (1996). Description: Breuss 2002b. Substrate: soil. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Placidium squamulosum* is common in biological soil crusts throughout western North America like *Clavascidium lacinulatum.* The two species often look similar in southern California and are only easily distinguished by the lack of thick rhizines in *P. squamulosum* (though it has abundant thin rhizohyphae). It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on soil, *Knudsen 11418 & Chaney* (UCR).

Placynthiella icmalea (Ach.) Coppins & P. James, Lichenologist 16: 244 (1984). Description: Ryan et al. 2004b. Substrate: non-calcareous rock, soil, bark, detritus, wood. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES**.** – *Placynthiella icmalea* is infrequent in California, often occurring in small populations as part of biological soil crusts. It is rare on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on soil, *Knudsen 7577* (UCR).

Placynthium nigrum (Hudson) Gray, Nat. Arr. Br. Pl. 1: 395 (1821). Description: Schultz 2002c. Substrate: calcareous rock, sometimes soil and bark. World distribution: Asia, Europe, North America. CINP distribution: SC. SC.

PLATE 16, FIG. B.

NOTES. – *Placynthium nigrum* is infrequent in California on calcareous rock and can be quite variable in morphology. The illustration presented here shows its distinctive blackish prothallus. The species is known only from Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, between Prisoner and Pelican Harbors, *Bratt 12453* (SBBG; det. Ryan).

***Plectocarpon nashii** Hafellner, Mycotaxon 84: 312 (2002). Description: Ertz and Diederich 2007. Substrate: *Niebla robusta* (possibly other *Niebla* species). World distribution: North America (California endemic). CINP distribution: WA (endemic).

NOTES**.** – The lichenicolous fungus *Plectocarpon nashii* is only known from the type collection which was made on West Anacapa Island. It is not known if it occurs on *Niebla* species other than *N. robusta*.

Voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on *Niebla robusta*, *Nash 37021-A* (ASU).

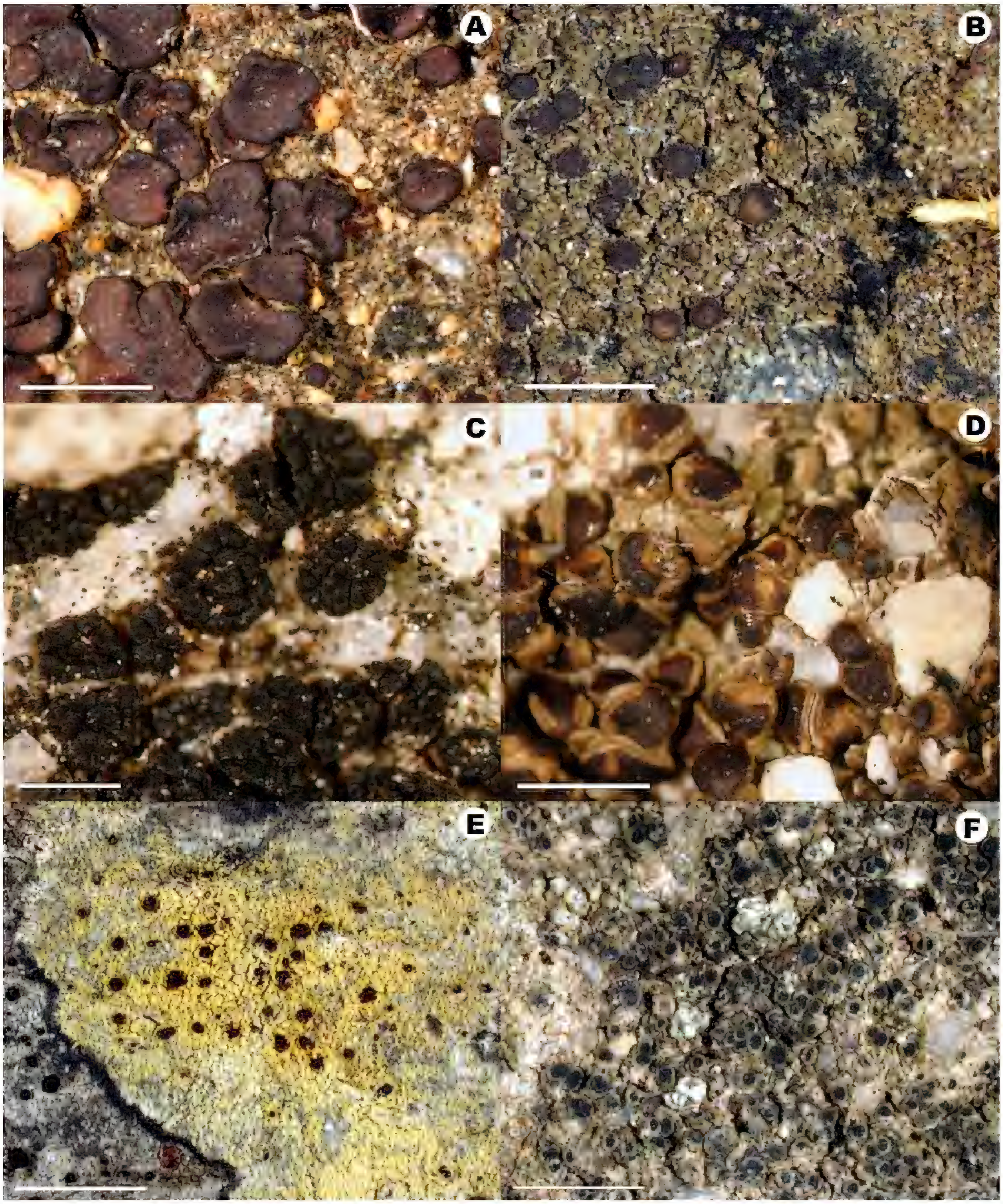

Plate 16, A, *Clavascidium lacinulatum* (*Knudsen 1188*, NY). B, *Placynthium nigrum* (*Hasse s.n.*, NY). C, *Polysporina simplex* (*Knudsen 11832*, UCR). D, *Protoparmelia badia* (*Lendemer 14989*, NY). E, *Pyrrhospora quernea* (*Knudsen 7561*, UCR). F, *Rinodina gennarii* (*Knudsen 11533*, UCR). Scales = 2.0 mm in E; 1.0 mm in A, B, D, F; 0.5 mm in C.

Pleopsidium chlorophanum (Wahlenb.) Zopf, Ann Chemie 284: 117 (1895). Description: Knudsen 2007b. Substrate: non-calcareous rock. World distribution: Antarctica, Europe, North and South America. CINP distribution: SC.

NOTES. – *Pleopsidium chlorophanum* is only known in California and North America from a single collection made by C. Bratt on the the west end of Santa Cruz Island. The name has been misapplied by many American lichenologists since the time of E. Tuckerman to the common montane species *P. flavum* (Bellardi) Körber.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, west end, on rock, *Bratt 3436* (ASU, SBBG; det. Knudsen).

***Polycoccum pulvinatum** (Eitner) R. Santesson, Lichens and Lichenicolous Fungi of Sweden and Norway: 175 (1993). Substrate: *Physcia* species. Description: Santesson 1993. World distribution: Europe, North America. CINP distribution: SC.

NOTES. – The lichenicolous fungus *Polycoccum pulvinatum* forms galls on *Physcia* species. It is here reported new for California.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on *Physcia, Kocourková 8161 & Knudsen* (UCR).

***Polysporina arenacea** (H. Magn.) K. Knudsen & Kocourk., Mycotaxon 105: 157 (2008). Description: Knudsen and Kocourková 2008. Substrate: various crustose lichens. World distribution: Asia, North America. CINP distribution: SR.

NOTES. – The lichenicolous fungus *Polysporina arenacea* is infrequent and widespread in western North America. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.**:** Santa Rosa Island, South Peak, on *Lecidella* species, *Knudsen et al. 8762.2* (UCR).

Polysporina simplex (Taylor) Vězda, Folia Geobot. Phytotax. Bohemoslov. 13: 399 (1978). Description: Knudsen 2007c. Substrate: calcareous and non-calcareous rocks. World distribution: cosmopolitan. CINP distribution: SC, SR.

PLATE 16, FIG. C.

NOTES. – *Polysporina simplex* is common in California though it is rarely collected. It is infrequent on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Windmill Canyon, on rock, *Knudsen 8888* (UCR).

***Polysporina subfuscescens** (Nyl.) K. Knudsen & Kocourk., Mycotaxon 105: 157 (2008). Description: Knudsen 2007a (as *Polysporina lapponica*), Knudsen and Kocourková 2008. Substrate: lichenicolous on crustose and endolithic lichens. World distribution: Asia, Europe, North America. CINP distribution: SC, SR.

NOTES. – *Polysporina subfuscescens* is a common lichenicolous fungus in California and is parasitic on a wide variety of saxicolous lichens. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Soledad grove, on unknown crustose lichens on rock, *Knudsen et al. 11293.1* (UCR).

Protoparmelia badia (Hoffm.) Hafellner, Beih. Nova Hedwigia 79: 292 (1984). Description: Ryan et al. 2004c. Substrate: non-calcareous rocks. World distribution: cosmopolitan. CINP distribution: SC.

PLATE 16, FIG. D.

NOTES. – *Protoparmelia badia* is infrequent in California. In CINP it is rare on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on rock, *Nash 33030* (ASU; det. Sheard).

Protoparmelia ryaniana v.d. Boom, Sipman & Elix, Lichen Flora of the Greater Sonoran Desert Region, 3: 392 (2007). Description: v.d. Boom et al. 2004. Substrate: juvenile parasite on *Dimelaena radiata*, developing an independent thallus. World distribution: North America. CINP distribution: SC, SR, WA.

NOTES. – *Protoparmelia ryaniana* is a coastal species in southern California. It is a juvenile parasite on *Dimelaena radiata*, eventually developing an independent thallus. In CINP it is known from West Anacapa, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on rock, *Knudsen 11439 & Chaney* (UCR).

Pseudosagedia aenea (Wallr.) Hafellner & Kalb, Biblioth. Lichenol. 57: 172 (1995). Description: Aptroot 2002c (as *Porina aenea*). Substrate: on oak bark and in California also on *Pinus muricata*. World distribution: northern hemisphere. CINP distribution: SC, SR.

NOTES. – *Pseudosagedia aenea* is rare in California where it is known only with certainty from CINP. The genus *Pseudosagedia* is considered a synonym of *Porina* by some authors (McCarthy & Malcom 1997). The species is rare on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on *Pinus muricata*, *Nash 33058* (ASU; det. Aptroot).

Pseudosagedia cestrensis (Tuck.) R.C. Harris, Opuscula Philolichenum 2: 15 (2005). Description: Aptroot 2002c (as *Porina cestrensis*). Substrate: bark, rarely soil or rock. World distribution: probably cosmopolitan. CINP distribution: SR.

NOTES. – *Pseudosagedia cestrensis* is rare in California where it is only known from the Channel Islands with certainly, though it possibly also occurs along central California coast.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on *Heteromeles arbutifolia*, *Nash 32962* (ASU; det. Aptroot).

Pseudosagedia chlorotica (Ach.) Hafellner & Kalb, Biblioth. Lichenol. 57: 172 (1995). Description: Aptroot 2002c (as *Porina chlorotica*). Substrate: calcareous and non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Pseudosagedia chlorotica* is rare along the coast of southern and central California. It occurs on Santa Cruz and Santa Rosa Islands in CINP. The ascospores can vary significantly in size.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, above Smuggler's Road, on volcanic rock, *Knudsen 14934 & Kocourková* (UCR).

Psora brunneocarpa Timdal, Lichen Flora of the Greater Sonoran Desert Region, 1: 420 (2002). Description: Timdal 2002b. Substrate: non-calcareous rock, soil. World distribution: North America. CINP distribution: SR.

NOTES. – *Psora brunneocarpa* occurs in Mexico and is known from California on the basis of a single collection that was made on Santa Rosa Island where it was found in a biological soil crust.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Peak, on soil, *Nash 33008* (ASU; det. Timdal).

Psora pacifica Timdal, Bryologist 89: 268 (1986). Description: Timdal 2002b. Substrate: soil. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Psora pacifica* is a frequent coastal species in southern California. It occurs in biological soil crusts on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, west end, on soil, *Knudsen et al. 8547* (UCR).

Psorotichia schaereri (A. Massal.) Arnold, Flora 52: 265 (1869). Description: Schultz 2007c. Substrate: calcareous and non-calcareous rock. World distribution: Asia, Europe, North America. CINP distribution: SR.

NOTES. – *Psorotichia schaereri* is rarely collected in California, but easily overlooked. In CINP it is known from a single collection on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Sierra Pablo Ridge, on rock, *Nash 32834* (ASU; det. Schultz).

Punctelia borreri (Smith) Krog, Nordic J. Bot. 2: 291 (1982). Description: Egan and Aptroot 2004; McCune and Geiser 2009. Substrate: bark of oaks. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Punctelia borreri* is infrequent along the central coast of California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Black Mountain, on moss and bark on *Quercus tomentella*, *Knudsen et al. 7687* (NY, UCR; det. Lendemer).

Punctelia jeckeri (Roum.) Kalb, Biblioth. Lichenol. 95: 312 (2007). Description**:** Lendemer and Hodkinson 2010. Substrate: bark, usually of oaks, and on non-calcareous rocks. World distribution: Europe, North America. CINP distribution: SC, SR.

NOTES. – In California, the common sorediate species *Punctelia jeckeri* usually occurs in mixed corticolous communities on Coast Live Oak. The names *P. subrudecta* (Nyl.) Krog and *P. perreticulata* (Räsänen) G. Wilh. & Ladd have been misapplied in the literature to the western North America populations of *P. jeckeri* (Lendemer & Hodkinson 2010). It occurs on Santa Cruz and Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on *Pinus muricata*, *Knudsen 10590* (UCR).

Pyrrhospora quernea (Dicks.) Körb., Syst. Lich. Germ.: 209 (1855). Description: Ryan et al. 2004d. Substrate: bark. World distribution: Africa, Asia, Europe, North America. CINP distribution: SC, SM, SR, WA.

PLATE 16, FIG. E.

NOTES**.** – *Pyrrhospora quernea* is common along the coast of California on a variety of trees and shrubs, and often also on old wood fences. It is often sterile. The species occurs on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on wood, *Chaney 9255* (SBBG; det. Bratt).

Pyrrhospora varians (Ach.) R.C. Harris, Evansia 2: 47 (1985). Description: (as *Lecidea varians*) Hertel and Printzen 2004. Substrate: bark. World distribution: Europe, North America. CINP distribution: SC, SR.

NOTES. – *Pyrrhospora varians* is infrequent in southern and central California. It is rare on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, China Camp, on wood of old *Heteromeles arbutifolia*, *Knudsen et al. 7818* (UCR).

Ramalina canariensis J. Steiner, Österr. Bot. Zeitschr. 9: 8 (1904). Description: Kashiwadani and Nash 2004. Substrate: bark. World distribution: cosmopolitan. CINP distribution: EA, SB, SC, SM, SR, WA.

NOTES. – *Ramalina canariensis* is common, especially along the central coast of California. It occurs on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Water Canyon, on *Quercus pacifica*, *Knudsen 7514* (UCR).

Ramalina farinacea (L.) Ach., Lich. Univ.: 606 (1810). Description: Kashiwadani and Nash 2004. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SC, SM, SR, WA.

NOTES. – *Ramalina farinacea* is common in California. It occurs on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, road to East Point, on *Quercus pacifica*, *Nash 32867* (ASU, UCR).

Ramalina leptocarpha Tuck., Suppl. Enum. N. Amer. Lich. 423 (1858). Description: Kashiwadani and Nash 2004. Substrate: bark. World distribution: North America. CINP distribution: SC, SM, SR, WA.

NOTES. – *Ramalina leptocarpha* is common in California. It occurs on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, near Smith Highway, on *Quercus tomentella*, *Knudsen 8857* (UCR).

Ramalina menziesii Taylor, London J. Bot. 6: 189. (1847). Description: Kashiwadani and Nash 2004. Substrate: bark. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Ramalina menziesii* is common in California. It occurs in scattered populations on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Dry Canyon, on *Heteromeles arbutifolia, Knudsen et al. 10536* (UCR).

Ramalina pollinaria (Westr.) Ach., Lich. Univ.: 608 (1810). Description: Kashiwadani and Nash 2004. Substrate: bark, and rock. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Ramalina pollinaria* is a frequent coastal species in California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Twin Faults, on *Quercus agrifolia*, *Nash 32920* (ASU; det. Kashiwadani).

Ramalina subleptocarpha Rundel & Bowler, Bryologist 79: 368 (1976). Description: Kashiwadani and Nash 2004. Substrate: bark. World distribution: North America. CINP distribution: SB, SC, SM, SR, WA.

NOTES. – *Ramalina subleptocarpha* is common in California. It occurs on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, Willow Canyon, on *Baccharis*, *Knudsen 6947* (UCR).

Rinodina bolanderi H. Magn., Bot. Not. 1947: 51 (1947). Description: Sheard 2010. Substrate: bark, detritus, soil, rock. World distribution: North America. CINP distribution: SC, SM, SR, WA.

NOTES. – *Rinodina bolanderi* is common in California on a variety of substrates. It usually occurs on rock on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, on rock, *Bratt 4958* (SBBG; det. Sheard).

Rinodina brouardii B. de Lesd., Ann. Crytog. Exot. 5: 131 (1932). Description: Sheard 2010. Substrate: rock. World distribution: North America. CINP distribution: SC.

NOTES. – *Rinodina brouardii* is a rare North American endemic occurring on the west slope of the Rockies. It is known from California from a single collection made on Santa Cruz Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, on rock, *Bratt 5707* (SBBG; det. Sheard).

Rinodina californiensis Sheard, Bryologist 105: 656 (2002). Description: Sheard 2010. Substrate: bark. World distribution: North America. CINP distribution: SC.

NOTES. – *Rinodina californiensis* is common in California in wide variety of habitats. It is occurs on Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, on bark, *Sheard 5130b* (ASU, SASK).

Rinodina capensis Hampe *ex* A. Massal., Memor. I. R. Isti. Veneto 10: 87 (1861). Description: Sheard 2010. Substrate: bark. World distribution: Asia, Africa, Europe, North America. CINP distribution: SC, SR.

NOTES. – *Rinodina capensis* is common in California and Oregon. It is rare on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on bark, *Wetmore 74537* (ASU, MIN; det. Sheard).

Rinodina endospora Sheard, Bryologist 105: 658. Description: Sheard 2010. Substrate: bark. World distribution: North America (California endemic). CINP distribution: SC, SR.

NOTES. – *Rinodina endospora* is a California endemic of the coastal ranges and Sierra Nevada Mountains. It appears to be rare on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, on bark, *Tucker 35866* (SBBG; det. Sheard).

Rinodina gennarii Bagl., Comment. Soc. Crittog. Ital. 1: 17 (1861). Description: Sheard 2010. Substrate: rock. World distribution: cosmopolitan. CINP distribution: EA, SC, SR.

PLATE 16, FIG. F.

NOTES. – *Rinodina gennarii* is a common on the California coast. It occurs on East Anacapa, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: East Anacapa Island, on basalt, *Knudsen 10922* (UCR).

Rinodina griseosoralifera Coppins, Lichenologist 21: 169 (1989). Description: Sheard 2010. Substrate: bark. World distribution: Europe, North America. CINP distribution: SM.

NOTES. – *Rinodina griseosoralifera* is rare in California, though this apparent rarity may be due to its undercollection at least along the northern coast. In CINP it is only known from a single collection made on San Miguel Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, on bark, *Tønsberg 25430* (BG).

Rinodina hallii Tuck., Bull. Torrey Bot. Club 5: 20 (1874). Description: Sheard 2010. Substrate: bark. World distribution: North America. CINP distribution: SC.

NOTES. – *Rinodina hallii* is a common species in central and northern California. It is rare on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, east of Stanton Ranch, on *Quercus agrifolia*, *Nash 32515a* (ASU; det. Sheard).

Rinodina herrei H. Magn., Bot. Not. 1953: 191. Description: Sheard 2010. Substrate: bark. World distribution: North America. CINP distribution: SC, SR.

PLATE 17, FIG. A.

NOTES. – *Rinodina herrei* is common along the California coast. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, on bark, *Sheard 5050* (ASU, SASK).

Rinodina innata Sheard, Bryologist 105: 660. Description: Sheard 2010. Substrate: calcareous rock and sandstone. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Rinodina innata* is a rare maritime species that was described from Santa Cruz Island. It is rare on the coast of California and infrequent on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, below Black Mountain, on rock, *Sheard 5048* (SASK, SBBG).

Rinodina intermedia Bagl., Comment. Soc. Crittog. Ital. 1: 315 (1863). Description: Sheard 2010. Substrate: soil, on spike moss and moss, rarely on old stems of dead shrub. World distribution: cosmopolitan. CINP distribution: SC, SR.

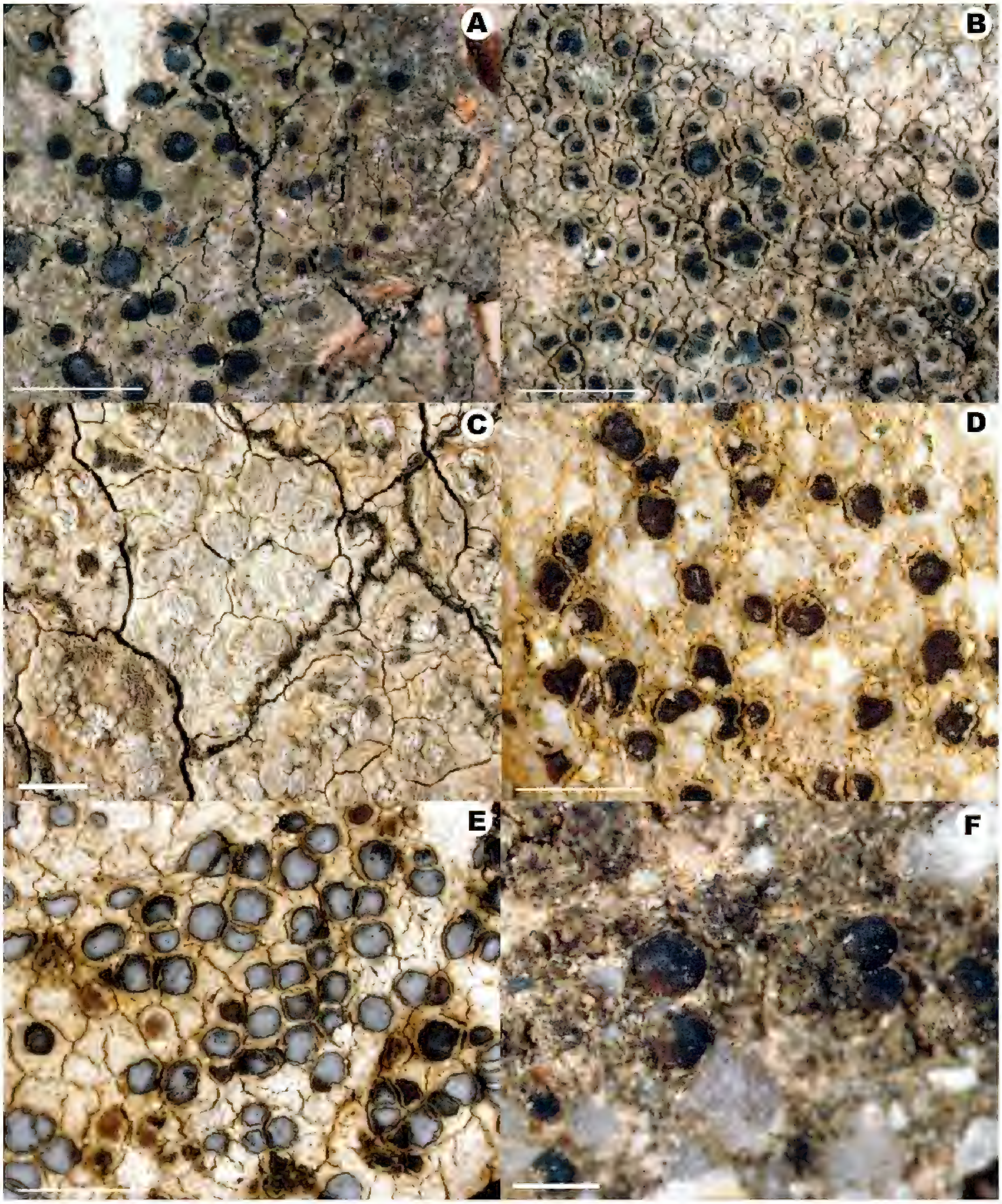

Plate 17, A, *Rinodina herrei* (*Knudsen 8949.2*, UCR). B, *R. pacifica* (*Knudsen 3744*, UCR). C, *Roccellina franciscana* (*Bjork 23541*, NY). D, *Sarcogyne arenosa* (*Knudsen 4078*, UCR). E, *S. regularis* (*Knudsen 6777*, UCR). F, *Scoliciosporum umbrinum* (*Hasse 1174*, NY). Scales = 1.0 mm in A-E; 0.5 mm in F.

NOTES. – *Rinodina intermedia* is one of the most common species found in biological soil crusts in southern California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on soil, *Knudsen 11428 & Chaney* (UCR).

Rinodina marysvillensis H. Magn., Ann. Cryptog. Exot. 5: 31 (1932). Description: Sheard 2010. Substrate: bark. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Rinodina marysvillensis* occurs along the coast of California. In CINP it occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, on bark, *Sheard 5038-A* (ASU, SASK)

Rinodina oxydata (A. Massal.) A. Massal., Neag. Lich.: 19 (1854). Description: Sheard 2010. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – *Rinodina oxydata* is apparently infrequent in California. In CINP it is known from a single collection that was made on Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, east of Stanton Ranch, on rock, *Nash 32557* (ASU; det. Sheard).

Rinodina pacifica Sheard, Bryologist 105: 666 (2002). Description: Sheard 2010. Substrate: calcareous rock and sandstone. World distribution: North America. CINP distribution: SB.

PLATE 17, FIG. B.

NOTES. – *Rinodina pacifica* is a rare maritime species known from the coast of western North America. In CINP it is known from a single collection made on Santa Barbara Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Barbara Island, *Bratt 5213* (SBBG; det. Sheard).

Rinodina poeltiana Giralt & W. Obermayer, Herzogia 9: 709 (1993). Description: Sheard 2010. Substrate: bark. World distribution: Europe, North America. CINP distribution: SC, SR.

NOTES. – *Rinodina poeltiana* is a rare species in North America that is known from Big Sur and the north Channel Islands. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, on *Quercus agrifolia, Sheard 5072-A* (SASK).

Rinodina santa-monicae H. Magn., Bot. Not. 1947: 42 (1947). Description: Sheard 2010. Substrate: bark. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Rinodina santa-monicae* was originally described from an H.E. Hasse collection made in the Santa Monica Mountains. It is one of the most common species on bark in California. In CINP it occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, below Black mountain, on bark, *Sheard 5088-A* (ASU, SASK).

Roccella gracilis Bory, Dict. Class. Hist. Nat. 14 : 631 (1828). Description: Tehler 2002d (as *Roccella peruensis*). Substrate: rocks, bark, wood. World distribution: North and South America. CINP distribution: SB, SR, WA.

NOTES. – *Roccella gracilis* reaches its northern distributional limit on the north Channel Islands. It occurs on West Anacapa, Santa Barbara, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, lower Oak Canyon, on *Prunus ilicifolia* trees, *Knudsen 10880* (UCR).

Roccellina conformis Tehler, Oper. Bot. 70: 50 (1983). Description: Tehler 2002e. Substrate: bark. World distribution: North America. CINP distribution: SR.

NOTES. – *Roccellina conformis* is common in Baja California and rare in California. It is infrequent on Santa Catalina Island and is known from a single collection on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on *Heteromeles arbutifolia, Nash 32963* (ASU; det. Tehler).

Roccellina franciscana (Zahlbr. *ex* Herre) Follmann *in* Huneck & Follmann, Philippia 4: 119 (1979). Description: Tehler 2002e. Substrate, bark, rock, wood. World distribution: North America. CINP distribution: SR.

PLATE 17, FIG. C.

NOTES. – *Roccellina franciscana* occurs along coast of western North America from Humboldt County to Baja California. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on *Quercus agrifolia*, *Nash 32950* (ASU; det. Tehler).

Roselliniella cladoniae (Anzi) Matzer & Hafellner, Biblioth. Lichenol. 37: 59 (1990). Description: Matzer and Hafellner 1990. Substrate: *Cladonia* species. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Roselliniella cladoniae* is known from North America only from Santa Rosa Island where it was collected on *Cladonia maritima*.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, on *Cladonia maritima*, *Kocourková & Knudsen s.n.* (PRM 909680, UCR).

Sarcogyne arenosa (Herre) K. Knudsen & Standley, Opuscula Philolichenum 2: 36 (2005). Description: Knudsen and Standley 2007. Substrate: calcareous and non-calcareous rock and occasionally on soil in biological soil crusts. World distribution: North America. CINP distribution: SC, WA.

PLATE 17, FIG. D.

NOTES. – *Sarcogyne arenosa* is common in southern and central California, especially on sandstone. On calcareous substrates it is can usually be found with *S. regularis*. The species was originally described from the Santa Cruz Mountains by A.W.C.T. Herre. It is rare on West Anacapa and Santa Cruz Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa, Summit Peak, on rock, *Knudsen 10877* (UCR).

Sarcogyne privigna auct. non (Ach.) A. Massal. Description: Knudsen and Standley 2007; Knudsen and Kocourková 2011. Substrate: calcareous and non-calcareous rock in drainages and seeps. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Sarcogyne privigna* is the current name applied to specimens which have a jointed margin with a disc that turns red in water and occur in western North America in drainages and seeps on non-calcareous or calcareous rock. It is common in California and rare in CINP where it occurs on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Dry Canyon, on rock, *Knudsen 10538* (UCR).

Sarcogyne regularis Körber, Syst. Lich. Germ.: 267 (1855). Description: Knudsen and Standley 2007. Substrate: calcareous substrate. World distribution: cosmopolitan. CINP distribution: SM.

PLATE 17, FIG. E.

NOTES. – *Sarcogyne regularis* is a strict calciphile usually with a pruinose apothecial disc. It is common throughout California on limestone and occasionally on calcareous sandstone. In CINP it is known from single collection on San Miguel Island

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, Green Mountain, on rock, *Knudsen 6777* (UCR).

†***Sarea resinae*** (Th. Fr.) Kuntze, Rev. Gen. Plant. 3: 515 (1898). Description: Nash 2007. Substrate: conifer resin. World distribution: Asia, Europe, North America. CINP distribution: SR.

NOTES. – *Sarea resinae* is a non-lichenized fungus that grows on the resin of conifer trees. It is probably frequent in California. In CINP it is known from single collection made on Santa Rosa Island.

Voucher. – **U.S.A. CALIFORNIA. SANTA BARBARA CO.:** Santa Rosa Island, below Black Mountain, on *Pinus muricata, Wetmore 73920* (MIN).

Schizopelte californica Th. Fr., Flora 58: 143 (1875). Description: Tehler 2002f. Substrate: rock. World distribution: North America. CINP distribution: EA, SB, SC, SM, SR, WA.

NOTES. – *Schizopelte californica* is frequent along the coast of central California and Baja California. It occurs on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on rock, *Knudsen 11980* (UCR)

Schizopelte crustosa Ertz & Tehler, Fungal Diversity 49: 58 (2011). Description: Egea and Torrente 2002 (as *Sclerophyton californicum*). Substrate: bark, rocks. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Schizopelte crustosa* occurs along the California coast from San Luis Obispo County south to Baja California. It is rare on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Christy Ranch, on rock, *W.A. Weber s.n. = Lich. Exs. COLO #661* (ASU; det. Egea).

Schizopelte parishii (Hasse) Ertz & Tehler, Fungal Diversity 49: 58 (2011). Description: Tehler 2002g (as *Hubbsia parishii*). Substrate: rock. World distribution: North America (California, Mexico). CINP distribution: EA, SB, SC, SM, SR, WA.

NOTES. – *Schizopelte parishii* occurs along the coast of California from Morro Rock south to Baja California. It is frequent on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on rock, *Knudsen 11396* (UCR).

Scoliciosporum umbrinum (Ach.) Arnold, Flora 54: 50 (1871). Description: Ekman and Tønsberg 2004. Substrate: non-calcareous rock, occasionally bark, once on caudex of *Leptosyne gigantea*. World distribution: cosmopolitan. CINP distribution: SR.

PLATE 17, FIG. F.

NOTES. – *Scoliciosporum umbrinum* is infrequent in coastal California from Point Reyes south to the Channel Islands. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Sierra Pablo Ridge, on rock, *Nimis s.n. [TSB—18508]* (ASU).

Seirophora californica (Sipman) Fröden, Lichenologist 36: 297. Description: Fröden et al. 2004 (as *Teloschistes californica*). Substrate: bark. World distribution: North America. CINP distribution: SB, SM, SR.

NOTES. – *Seirophora californica* occurs in California only on the Channel Islands where it is infrequent. It occurs on Santa Barbara, San Miguel, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, San Miguel Hill, on *Baccharis, Knudsen 6785.1* (UCR).

Sigridea californica (Tuck.) Tehler, Crypt. Bot. 3: 143 (1991). Description: Tehler 2002g. Substrate: bark. World distribution: North America. CINP distribution: SC, SR.

PLATE 18, FIG. A.

NOTES. – *Sigridea californica* is common on the Channel Islands and along the coast of California, growing on a variety of native trees as well as non-native *Eucalyptus* (one of few lichens found on the latter in California). It is common on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, the Ranch, on old corral fences, *Knudsen 8977* (UCR).

Skyttea pertusariicola Diederich & Etayo, Lichen Flora of the Greater Sonoran Desert Region 2: 694 (2004). Description: Diederich and Etayo 2004. Substrate: *Pertusaria* species. World distribution: Europe, North America. CINP distribution: SR.

NOTES. – The lichenicolous fungus *Skyttea pertusariicola* is only known in California from San Nicolas Island and in CINP on Santa Rosa Island. It is common on the latter island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, west rim of Cow Canyon, on *Pertusaria flavicunda*, *Knudsen et al. 10580* (UCR).

Skyttea tavaresiae R. Sant., Etayo & Diederich *in* Diederich & Etayo, Lichenologist 32: 447 (2002) . Description: Diederich and Etayo 2004. Substrate: *Pyrrhospora quernea*. World distribution: North America (California endemic). CINP distribution: SM.

NOTES. – *Skyttea tavaresiae* is common along the central coast of California, at least from Cambria to Monterey. It was reported from San Miguel Island based on an uncited specimen by Diederich and Etayo (2004).

No voucher was seen for this study.

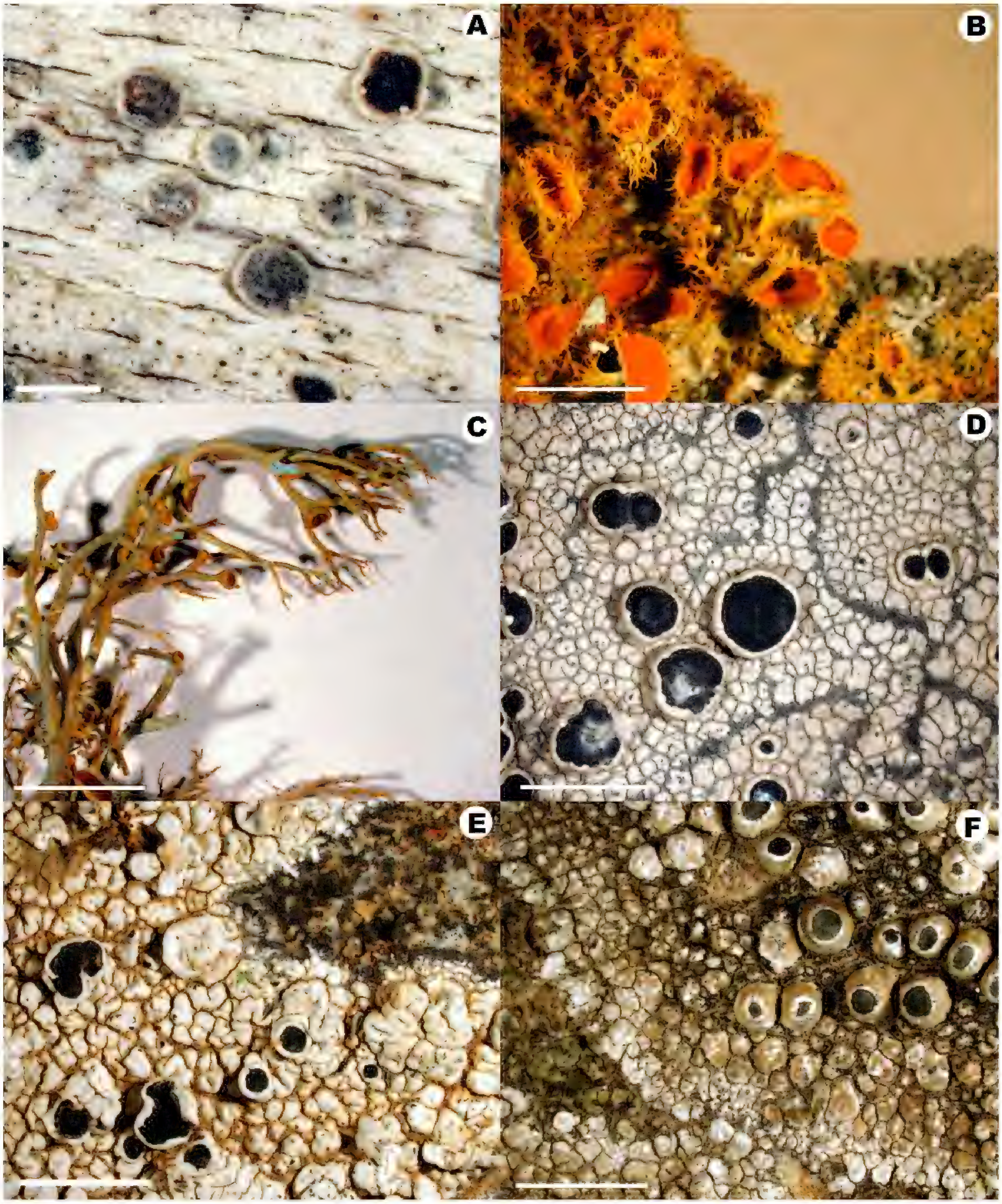

Plate 18, A, *Sigridea californica* (*Knudsen 12184*, UCR). B, *Teloschistes chrysophthalmus* (*Knudsen 11438.1*, UCR). C, *Teloschistes flavicans* (*Knudsen 7665.1*, UCR). D, *Tephromela atra* (*Herre 970*, NY). E, *T. nashii* (*Nash 40132*, NY). F, *Thelomma mammosum* (*Lendemer 11388*, NY). Scales = 2.0 mm in B-F; 0.5 mm in A.

Solenopsora crenata (Herre) Zahlbr., Catal. Lich Unvers. 5: 755 (1928). Description: Ryan and Timdal 2002. Substrate: soil, rock. World distribution: North America. CINP distribution: SB, SC.

NOTES. – *Solenopsora crenata* was originally described from the Santa Cruz Mountains where it was apparently common at the beginning of the 20th century based on the amount of collections by Herre in the Farlow Herbarium. Nonetheless it is rare in southern California. Within CINP it is rare on Santa Barbara and Santa Cruz Islands where it occurs in biological soil crusts.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO. Santa Barbara Island, on soil, *Bratt 9370* (SBBG; det. Ryan).

Sparria cerebriformis (Egea & Torrente) Ertz & Tehler, Fungal Diversity 49: 58 (2011). Description: Egea and Torrente 2002c (as *Sclerophyton cerebriformis*). Substrate: rock. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Sparria cerebriformis* is rare along the coast of California from San Luis Obispo south to Baja California. It is rare in CINP where it occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Fraser Point, on rock, *Nash 32417* (ASU; det. Egea & Torrente).

Sphinctrina leucopoda Nyl., Flora 42: 44. (1859). Description: Tibell 2004. Substrate: usually on *Pertusaria* species. World distribution: Europe, North America. CINP distribution: SC, SR.

NOTES. – The lichenicolous fungus *Sphinctrina leucopoda* is common in California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on unknown host on bark, *Knudsen 11921* (UCR).

Staurothele areolata (Ach.) Lettau, Hedwigia 52: 84 (1912). Description: Thomson 2002. Substrate: calcareous and non-calcareous rock. World distribution: Asia, Europe, North America. CINP distribution: SR.

NOTES. – *Staurothele areolata* is probably common in California though undercollected. In CINP it is rare on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Sierra Pablo Ridge, on rock, *Nash 32824* (ASU; det. Ryan).

Staurothele drummondii (Tuck.) Tuck., Genera Lich.: 257 (1872). Description: Thomson 2002. Substrate: calcareous and non-calcareous rock. World distribution: Asia, Europe, North America. CINP distribution: SR.

NOTES. – *Staurothele drummondii* is frequent in southern California in a wide range of habitats from the Channel Islands to the Clark Mountains in the Mojave. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Bee Canyon, on rock, *Knudsen et al. 10502* (UCR).

Sticta fulginosa (Hoffm.) Ach., Lich. Meth. 280 (1803). Description: Galloway and Thomas 2004. Substrate: calcareous and non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Sticta fulginosa* is frequent in California. It is rare on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, along Burma Road, on rock and soil, *Bratt 11065* (SBBG).

Stigmidium californicum K. Knudsen & Kocourk., Biblio. Lichenol. 105: 26-27 (2010). Description: Knudsen and Kocourková 2010c. Substrate: *Caloplaca* species on bark. World distribution: North America. CINP distribution: EA, SR.

NOTES. – The lichenicolous fungus *Stigmidium californicum* is only known in California from CINP. It grows on *Caloplaca stipitata* and *C. stanfordensis.* The species was described from East Anacapa Island. It occurs on East Anacapa and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Sandy Point, on *Caloplaca stanfordensis, Knudsen et al. 7794.2* (UCR).

Stigmidium epistigmellum (Nyl. *ex* Vouaux) Kocourk. & K. Knudsen, Bryologist 112: 579 (2009). Description: Kocourková and Knudsen 2009a. Substrate: saxicolous coastal *Caloplaca* species. Distribution; North America (California, Baja Mexico). CINP distribution: EA, SB, SC, SM, SR, WA

NOTES. – *Stigmidium epistigmellum* is common along the southern and central California coast to San Luis Obispo County as well as on all the of north Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, beach near East Point, on areoles and apothecia of *Caloplaca bolacina*, *Knudsen et al. 8868* (UCR).

Stigmidium epixanthum Hafellner *in* Hafellner et al., Mycotaxon 84: 317 (2002). Description: Triebel and Cáceres 2004. Substrate: yellow *Acarospora* species. World distribution: Africa, Australia, North and South America. CINP distribution: SR, WA.

NOTES. – The lichenicolous fungus *Stigmidium epixanthum* is common on *Acarospora socialis* in California. It occurs on West Anacapa and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on *Acarospora socialis*, *Knudsen 10775* (UCR).

Stigmidium hesperium Kocourk., K. Knudsen & Diederich, Czech Mycology 61: 76 (2009). Description: Kocourková and Knudsen 2009b. Substrate: maritime *Caloplaca* species. World distribution: North America. CINP distribution: SR.

NOTES. – *Stigmidium hesperium* is common along the central California coast on *Caloplaca* species, including *C. coralloides*. It is rare on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on *Caloplaca coralloides, Knudsen 11375* (UCR).

Stigmidium pumilum (Lett.) Matzer *in* Matzer and Hafellner, Biblioth. Lichenol. 37: 115 (1990). Description: Triebel and Cáceres 2004. Substrate: *Physcia* species. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Stigmidium pumilum* is apparently rare in California. It occurs on *Physcia phaea* on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, on *Physcia phaea*, *Kocourková & Knudsen s.n.* (PRM 909121).

Stigimidium squamariae (B. de Lesd.) Cl. Roux & Triebel, Bull. Soc. Linn. Provence 45: 511 (1994). Description: Triebel and Cáceres 2009. Substrate: *Lecanora muralis* group. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Stigmidium squamariae* is common in California on members of the *Lecanora muralis* group. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Clapp Springs, on *Lecanora muralis*, *Knudsen et al. 10451* (UCR).

Stigmidium xanthoparmeliarum Hafellner, Bull. Soc. Linn. Provence 44: 231 (1994). Description: Hafellner 1994. Substrate: *Xanthoparmelia* species. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – The lichenicolous fungus *Stigmidium xanthoparmeliarum* is common in California. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, on *Xanthoparmelia* species, *Kocourková & Knudsen s.n.* (PRM 909688).

Syzygospora physciacearum Diederich, Biblioth. Lichenol. 61: 38 (1996). Description: Diederich 2004d. Substrate: *Hetereodermia, Physcia,* and *Physconia* species. World distribution: probably cosmopolitan. CINP distribution: SR, WA.

NOTES. – The lichenicolous fungus *Syzygospora physciacearum* is common in California. It occurs on West Anacapa and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on *Heterodermia namaquana, Knudsen 10831* (UCR)

Teloschistes chrysophthalmus (L.) Th. Fr., Gen. Heterolich.: 51 (1860). Description: Fröden et al. 2004. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SC, SR.

PLATE 18, FIG. B.

NOTES. – *Teloschistes chrysophthalmus* is frequent along the central California coast south to Baja California. It is frequent on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, South Point, on bark, *Knudsen 11438.1* (UCR).

Teloschistes flavicans (Sw.) Norman, Conat. Praem. Gen. Lich.: 17. 1852. Description: Fröden et al. 2004. Substrate: bark, rarely rock. World distribution: tropical and subtropical regions. CINP distribution: SC, SM, SR.

PLATE 18, FIG. C.

NOTES. – *Teloschistes flavicans* is infrequent along the California coast from Monterey County south to Baja California. It is part of the tropical biogeographic unit in the California lichen biota and is frequent on San Miguel, Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, on rock, *Knudsen 7774* (UCR).

Tephromela atra (Hudson) Hafellner, Lich. Neotropici 297 (1983). Description: Nash et al. 2004. Substrate: non-calcareous & calcareous rock, rarely on wood. World distribution: cosmopolitan. CINP distribution: SC, SM, SR.

Plate 18, Fig. D.

NOTES. – *Tephromela atra* is common in California and in the southern portion of the state is often sympatric with *T. nashii* near the coast. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on Monterey shale, *Knudsen 11944* (UCR).

Tephromela nashii Kalb, Lich. Neotropici 523 (1991). Description: Nash et al. 2004. Substrate: rock. World distribution: North America. CINP distribution:

PLATE 18, FIG. E.

NOTES. – *Tephromela nashii* is a common coastal lichen that is distributed from the Channel Islands south to Baja California. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Water Canyon, on rock, *Knudsen 8673 & Kocourková* (UCR).

Thelenella muscorum (Th. Fr.) Vainio, Termesz. Füzetek 22: 341 (1899). Description: Mayrhofer 2002 (as *Chromatochlamys muscorum*). Substrate: mosses, non-calcareous rock. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – *Thelenella muscorum* is rare in California. It is known from single collection made on Santa Cruz Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Prisoners Harbor, on moss over rock, *Nash 32541* (ASU; det. Aptroot).

Thelomma mammosum (Hepp *ex* Hartung) A. Massal., Bot. Not. 129: 233 (1976). Description: Tibell and Ryan 2002c. Substrate: usually non-calcareous rock. World distribution: Africa, Europe, North America. CINP distribution: EA, SB, SC, SM, SR, WA.

PLATE 18, FIG. F.

NOTES. – *Thelomma mammosum* is common along the coast of southern and central California. It occurs on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on rock, *Knudsen 7369 & Baguskus* (UCR).

Thelomma santessonii L. Tibell, Bot. Not. 129: 242 (1976). Description: Tibell & Ryan 2002c. Substrate: usually non-calcareous rock. World distribution: North America. CINP distribution: EA, SC, SM, SR, WA.

Plate 19, Fig. A.

NOTES. – *Thelomma santessonii* is sympatric with *T. mammosum* in California but usually has larger, more olive-colored verrucae and is UV+ white with divaricatic acid in the cortex. It is frequent on Anacapa, San Miguel, Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Water Canyon, on rock, *Knudsen 8676 & Kocourková* (UCR).

Thelopsis isiaca Stizenb., St. Gallisch naturw., Ges. 1893-1894: 262 (1895). Description: Tretiach et al. 2002. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – *Thelopsis isiaca* is rare in southern California, where it is currently only known from the Channel Islands. It is rare on Santa Cruz Island in CINP.

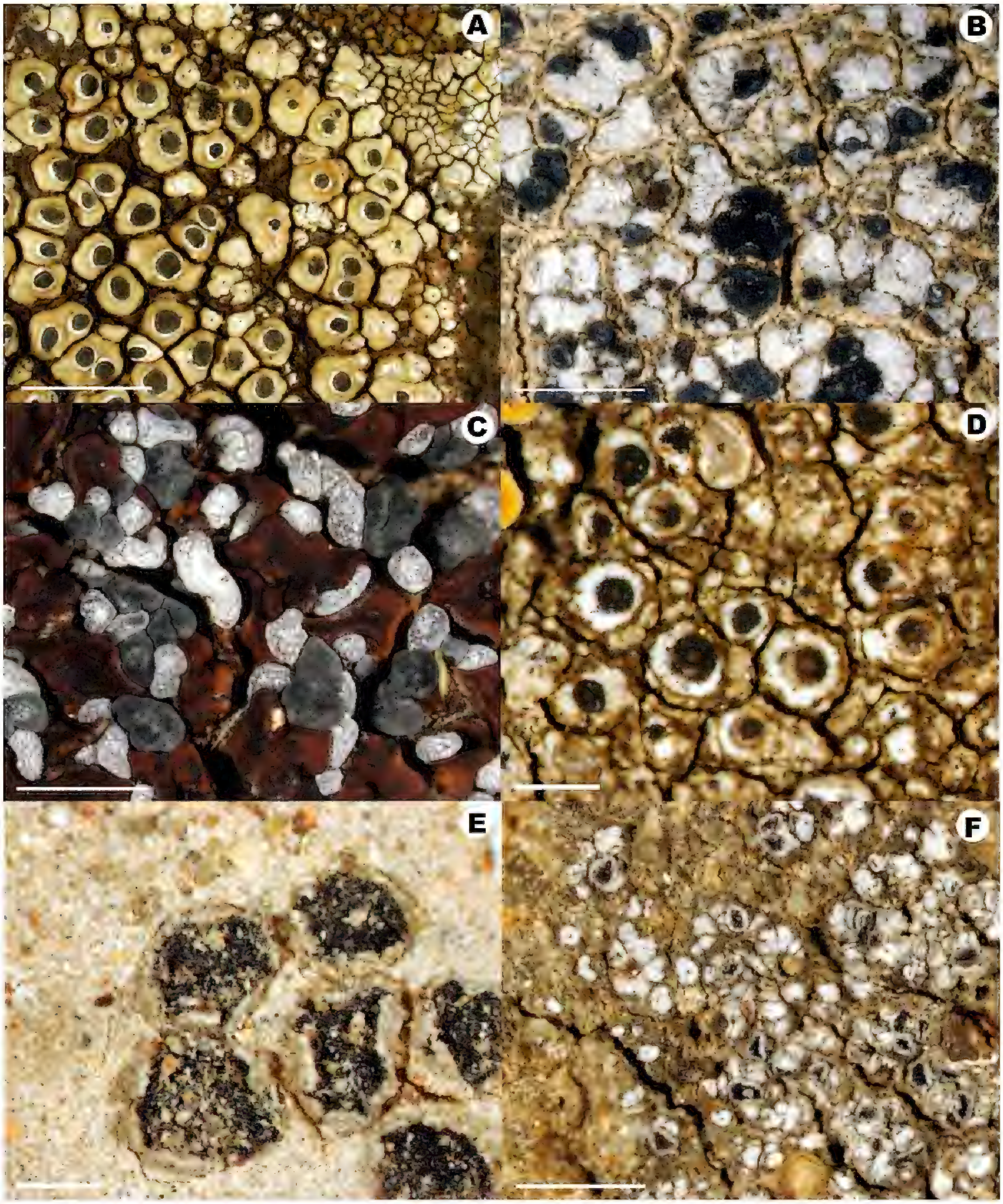

Plate 19, A, *Thelomma santessonii* (*Nash 38262*, NY). B, *Toninia aromatica* (*Knudsen 10482*, UCR). C, *Toninia sedifolia* (*Lendemer 14874*, NY). D, *Topelia californica* (*Knudsen 10046*, UCR). E, *Trapelia coarctata* (*Herre 1200*, NY). F, *Trapelia glebulosa* (*Hasse s.n.*, NY). Scales = 2.0 mm in A; 1.0 mm in B and C; 0.5 mm in E and F.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Cañada del Puerto, on bark, *Bratt 3382* (UCR).

Toninia aromatica (Sm.) A. Massal., Framm. Lichenogr.: 24 (1855). Description: Timdal 2002c. Substrate: soil, rock. World distribution: cosmopolitan. CINP distribution: SB, SC, SM. SR.
PLATE 19, FIG. B.

NOTES. – *Toninia aromatica* is common in southern California, usually occurring in biological soil crusts, especially Riversidian crusts (Hernandez and Knudsen 2012). It occurs on San Miguel, Santa Barbara, Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, Willow Canyon, on rock, *Knudsen 6908* (UCR).

Toninia nashii Timdal, Lichen Flora of the Greater Sonoran Desert region, 1: 493 (2002). Description: Timdal 2002c. Substrate: soil over sandstone. World distribution: North America (California endemic). CINP distribution: SM (endemic).

NOTES. – The crustose species *Toninia nashii* is only known from the type collection that was made on Green Mountain on San Miguel Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, Green Mountain, soil over sandstone, N*ash 41446* (ASU [holotype missing]; O [holotype(?) or, isotype]).

Toninia ruginosa ssp. ***pacifica*** Timdal, Oper. Bot. 110: 90 (1991). Description: Timdal 2002c Substrate: soil. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Toninia ruginosa* ssp. *pacifica* occurs along the coast of California inland to Arizona. It has larger squamules than *T. ruginosa* subsp. *ruginosa* and ascospores that usually have less septa. It is infrequent on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Torrey Pine Forest, on volcanic breccia, *Knudsen 7431.1 & Baguskus* (UCR).

Toninia sedifolia (Scop.) Timdal, Oper. Bot. 110: 93 (1992). Description: Timdal 2002c. Substrate: soil and calcareous rock. World distribution: cosmopolitan. CINP distribution: SM.
PLATE 19, FIG. C.

NOTES. – *Toninia sedifolia* is a common calciphile in California. It occurs in biological soil crusts on San Miguel Island and in the illustration presented here is growing with *Clavascidium lacinulatum.*

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, on soil, *Knudsen 6675* (UCR).

Toninia subdispersa (Nyl. *ex* Hasse) K. Knudsen, Mycotaxon 101: 84 (2007). Description: Timdal 2002c (as *T. talprum*). Substrate: *Lecania* species. World distribution: Europe, North America. CINP distribution: EA, SC, SM, SR, WA.

NOTES. – *Toninia subdispersa* is a lichenicolous fungus that is common on *Lecania* species in California, especially on the Channel Islands. It occurs on Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Carrington Point, on *Lecania franciscana, Knudsen et al. 8843.1* (UCR).

Toninia subtalparum v.d. Boom, Lichen Flora of the Greater Sonoran Desert Region 2: 708 (2004). Description: v.d. Boom 2004. Substrate: *Lecania dudleyi*. World distribution: North America. CINP distribution: SR.

NOTES. – The lichenicolous fungus *Toninia subtalparum* is apparently restricted to *Lecania dudleyi*. It should not be confused with the common *T. subdispersa* which also occurs on *L. dudleyi* as well as other species of the same genus. It is known in California only from Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Brockway Point, on *Lecania dudleyi*, *Knudsen et al. 7741* (UCR).

Topelia californica P.M. Jørg. & Vězda, Beih. Nova Hedwig. 79: 504 (1984). Description: Nash and Nimis 2002. Substrate: bark. World distribution: North America (California endemic). CINP distribution: SC, SR.

PLATE 19, FIG. D.

NOTES. – *Topelia californica* is endemic to California, occurring along the central California coast on native phorophytes. It is one of the few corticolous species found also growing on non-native *Eucalyptus*. The saxicolous species *T. gyalectodes* (Nyl.) B.D. Ryan & Lumbsch is only known from the type collection which was made in Malibu Canyon in the Santa Monica Mountains. It may be discovered on the Channel Islands. *Topelia californica* occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Ranch, on *Eucalyptus*, *Knudsen 8975.2* (UCR).

Tornabea scutellifera (With.) J.R. Laundon, Lichenologist 16: 226 (1984). Description: Nimis and Tretiach 2002. Substrate: bark, rock. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Tornabea scutellifera* is only known in California from Santa Rosa Island where it is rare.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Bee Canyon, on sandstone, *Wetmore 73683* (MIN).

Trapelia coarctata (Turner *ex* Small) M. Choisy *in* Werner, Bull. Soc. Sc. Nat. Maroc 12: 160 (1932). Description: Lumbsch and Kainz 2004. Substrate, rock, bricks, soil. World distribution: cosmopolitan. CINP distribution: SC, SR.

PLATE 19, FIG. E.

NOTES. – *Trapelia coarctata* is infrequent in California but may be undercollected. The illustration presented here shows the emergent apothecia with ragged thalline margins. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Outhouse Canyon, on consolidated soil, *Knudsen 7631* (UCR).

Trapelia glebulosa (Sw.) J.R. Laundon, Herzogia 2: 508 (1973). Description: Lumbsch and Kainz 2004 (as *Trapelia involuta*). Substrate, rock, pebbles, soil, wood. World distribution: cosmopolitan. CINP distribution: SC, SR, WA.

PLATE 19, FIG. F.

NOTES. – *Trapelia glebulosa* is common in California and is often a pioneer species dominating newly available substrates. It is often a component in biological soil crusts (Hernandez and Knudsen 2012). The species occurs on West Anacapa, Santa Cruz, and Santa Rosa Islands in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, along Burma Road, on soil, *Knudsen et al. 7782.3* (UCR).

Trapeliopsis flexuosa (Fr.) Coppins & P. James, Lichenologist 16: 258 (1984). Description: Printzen and McCune 2004. Substrate: decorticated wood, scrap lumber and fence posts, burnt wood. World distribution: cosmopolitan. CINP distribution: SC, SM, SR.

PLATE 20, FIG. A.

NOTES. – *Trapeliopsis flexuosa* is common in California on old wood. It is often sterile, and is easily identified by the usually abundant soralia of a darker color than the pale thallus. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on redwood fence, *Nash 32994* (ASU; det. Printzen).

Trapeliopsis glaucopholis (Nyl. *ex* Hasse) Printzen & McCune, Lichen Flora of the Greater Sonoran Desert Region 2: 539 (2004). Description: Printzen and McCune 2004. Substrate: soil, decaying sandstone. World distribution: North America. CINP distribution: SC, SR.

PLATE 20, FIG. B.

NOTES. – *Trapeliopsis glaucopholis* is common in biological soil crusts or on soil over rock on outcrops in California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO. Santa Rosa Island, off Telephone Road, on soil, *Knudsen et al. 7699* (UCR).

Tremella dendrographae Diederich & Tehler, Biblioth. Lichenol. 61: 74 (1996). Description: Diederich 2004e. Substrate: *Dendrographa* species. World distribution: North America. CINP distribution: SR.

NOTES. – The lichenicolous fungus *Tremella dendrographae* is frequent on *Dendrographa* species along the California coast. It occurs on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO. Santa Rosa Island, Lobo Canyon, on *Dendrographa minor*, *Nash 32972* (ASU; det. Diederich.)

Tremella nieblae Diederich & van den Boom in Diederich, Opuscula Philolichenum 4: 16 (2007). Description: Diederich 2007e. Substrate: *Niebla cephalota, N. homalea*. World distribution: North America. CINP distribution: SR.

NOTES. – The lichenicolous fungus *Tremella nieblae* is frequent along the central and northern coast of California. It occurs on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO. Santa Rosa Island, Cherry Canyon, on *Niebla cephalota, Knudsen 7837* (UCR).

Tremella parmeliarum Diederich, Biblioth. Lichenol. 61: 125 (1996). Description: Diederich 2004e. Substrate: *Parmotrema* species. World distribution: cosmopolitan. CINP distribution: SR, WA.

NOTES. – *Tremella parmeliarum* is infrequent in California. It occurs on West Anacapa and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO. Santa Rosa Island, hills above Beecher Bay, on *Parmotrema* species, *Knudsen 7504.5*

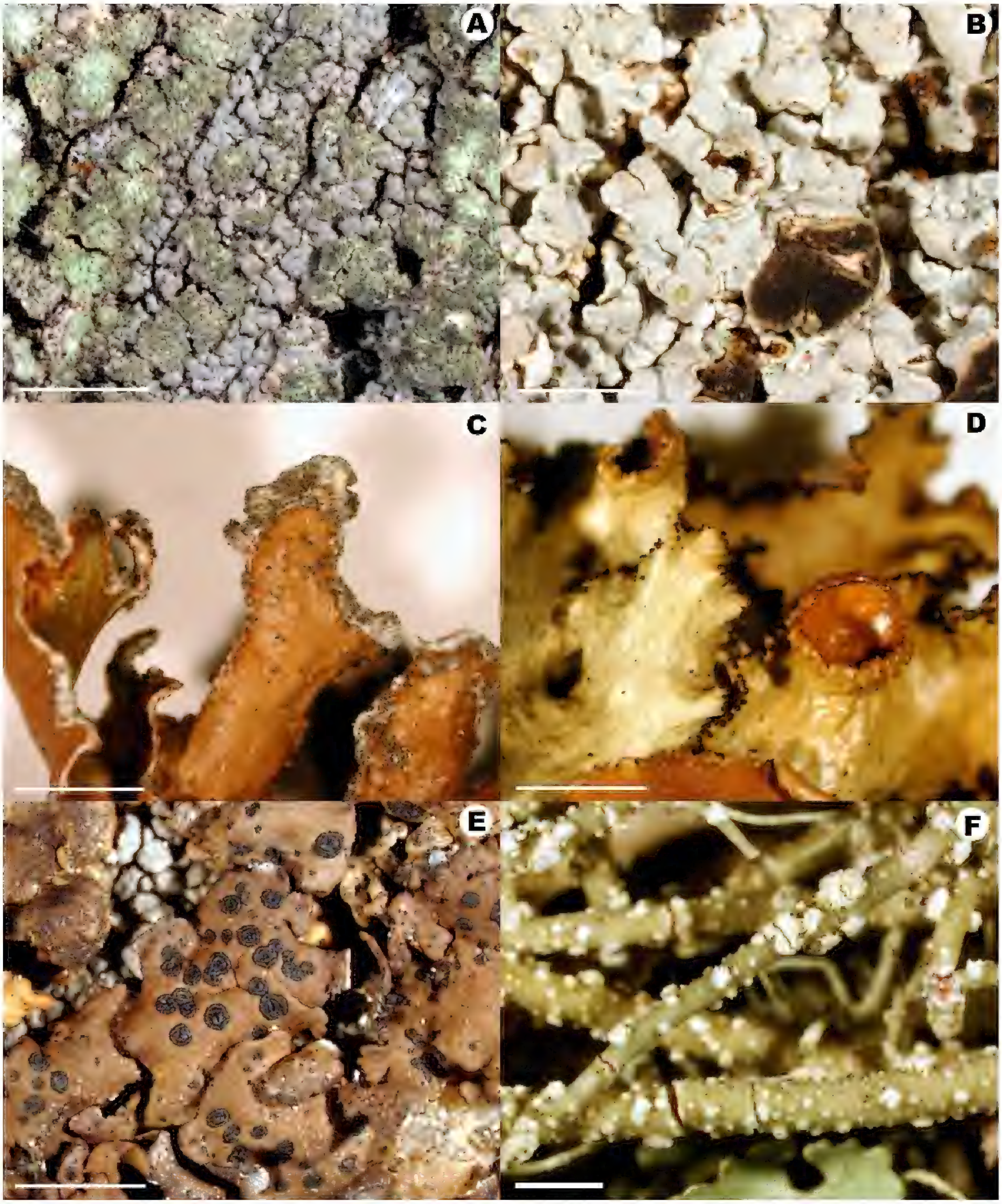

Plate 20, A, *Trapelia flexuosa* (*Lendemer 19750*, NY). B, *Trapeliopsis glaucopholis* (*Knudsen 11387*, UCR). C, *Tuckermanopsis chlorophylla* (*Lendemer 19589*, NY). D, *Tuckermanopsis orbata* (*Herre s.n.*, NY). E, *Umbilicaria phaea* (*Lendemer 14943*, NY). F, *Usnea ceratina* (*Buck 53927*, NY). Scales = 1.0 mm in A-E; 0.5 in F.

Tremella ramalinae Diederich, Biblioth. Lichenol. 61: 152 (1996). Description: Diederich 2004e. Substrate: *Ramalina* species. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – *Tremella ramalinae* is infrequent in California where it occurs on *Ramalina* species. It occurs on Santa Cruz Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO. Santa Cruz Island, on *Ramalina pollinaria, Tucker 35762-C* (ASU).

Tuckermanopsis chlorophylla (Willd.) Hale *in* Egan, Bryologist 96: 164 (1987). Description: Esslinger 2004b. Substrate: bark, rarely rock. World distribution: cosmopolitan. CINP distribution: SC, SR.

PLATE 20, FIG. C.

NOTES. – *Tuckermanopsis chlorophylla* is common in California, especially in the Sierra Nevada Mountains. It is rare on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, close to radar station, on soil and rock, *Ryan 31088* (ASU; det. Esslinger).

Tuckermanopsis orbata (Nyl.) M.J. Lai, Quart. J. Taiwan Mus. 33: 226 (1980). Description: Esslinger 2004b. Substrate: bark, rarely rock. World distribution: North America. CINP distribution: SC, SR.

PLATE 20, FIG. D.

NOTES. – *Tuckermanopsis orbata, like T. chlorophylla,* is common in California, especially in the Sierra Nevada Mountains, but it is rare on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, north slope of Black Mountain, on dead wood of *Pinus muricata, Baguskus s.n.* (UCR).

Umbilicaria phaea Tuck., Lich. Calif.: 15 (1866). Description: McCune and Geiser 2009. Substrate: non-calcereous rock. World distribution: North and South America. CINP distribution: SC, SR.

PLATE 20, FIG. E.

NOTES. – *Umbilicaria phaea* is common throughout California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, trail to High Mountains, on basalt, *Knudsen 11985* (UCR).

Usnea brasiliensis (Zahlbr.) Motyka, Lichen Gen. Usnea Stud. Monogr. Pars System. 2: 486 (1938). Description: Clerc 2007 (as *Usnea cornuta* subsp. *brasiliensis*). Substrate: bark, wood, rarely rock. World distribution: North and South America. CINP distribution: SC.

NOTES. – *Usnea brasiliensis* is rare along southern California coast. It occurs on Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, on bark, *Clerc 34404 & Bratt* (ASU).

Usnea brattiae P. Clerc, Lichen Flora of the Greater Sonoran Desert Region 3: 310 (2007). Description: Clerc 2007. Substrate: bark. World distribution: North America. CINP distribution: SC, SM, SR.

NOTES. – *Usnea brattiae* is infrequent from Santa Ynez Valley south along the California coast. It was named for the California lichen collector C. Bratt. The species occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, on *Baccharis*, *Knudsen 6754* (UCR).

Usnea ceratina Ach., Lich. Univ.: 619 (1810). Description: Clerc 2007. Substrate: bark. World distribution: Asia, Europe, North and South America. CINP distribution: SC, SR.

PLATE 20, FIG. F.

NOTES. – *Usnea ceratina* is common along the central California coast. It is common on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, summit of Black Mountain, on *Quercus tomentella, Knudsen et al. 7685.1* (UCR)

Usnea cornuta Körber, Parerga Lichenol.: 2 (1859). Description: Clerc 2007. Substrate: bark, wood, rarely rock. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Usnea cornuta* is frequent on the central coast of California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, along Burma Road, on rock, *Knudsen 7776.1* (UCR).

Usnea dasaea Stirton, Scott. Naturalist (Perth) 6: 104 (1881). Description: Clerc 2007. Substrate: bark, wood, rarely rock. World distribution: cosmopolitan. CINP distribution: SC, SM, SR.

NOTES. – *Usnea dasaea* is rare along the California coast, but is frequent on the Channel Islands. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, San Miguel Hill, on *Baccharis*, *Knudsen 6786.2* (UCR; det. Lendemer).

Usnea esperantiana P. Clerc, Candollea 47: 514 (1992). Description: Clerc 2007. Substrate: bark, wood, rarely rock. World distribution: Africa, Europe, North and South America. CINP distribution: SC, SR.

PLATE 21, FIG. A.

NOTES. – *Usnea esperantiana* is frequent along the central coast and on the Channel Islands. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Soledad, on *Quercus tomentella, Knudsen 7769* (NY, UCR; det. Lendemer).

Usnea flavocardia Räsänen, Revista Universitaria (Santiago) 21: 139 (1936). Description: Clerc 2007. Substrate: bark, rock. World distribution: Africa, Europe, North and South America. CINP distribution: SC, SM, SR, WA.

NOTES. – The red-spotted species *Usnea flavocardia* is frequent along the California coast. It occurs on West Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, on *Baccharis*, *Knudsen et al. 8715* (NY, UCR).

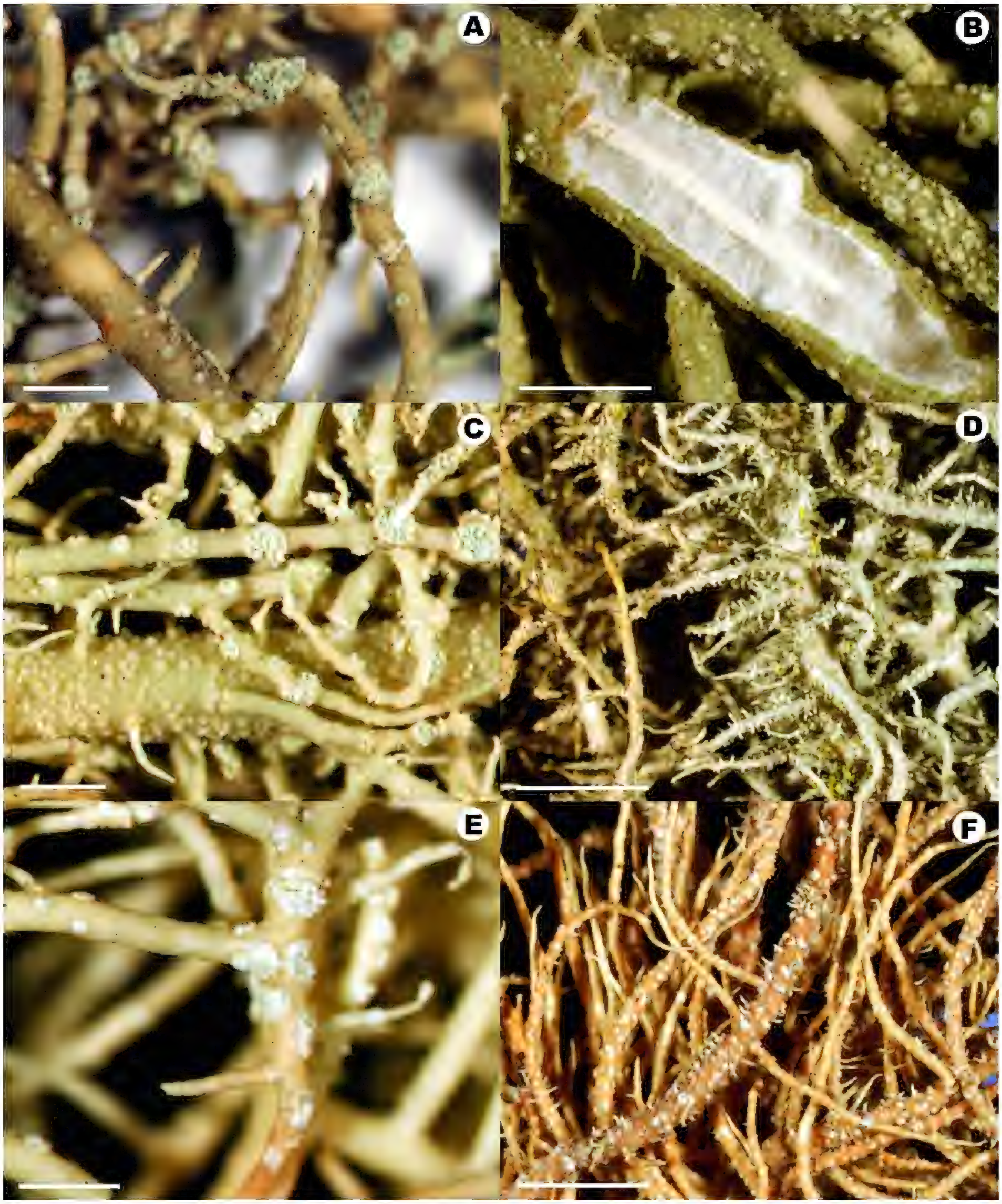

Plate 21, A, *Usnea esperantiana* (*Knudsen 8781*, NY). B, *U. fragilescens* (*Knudsen 8536*, NY). C, *U. fulvoreagens* (*Lendemer 5724*, NY). D, *U. hirta* (*Lendemer 14775* NY). E, *U. lapponica* (*Knudsen 6703,* UCR). F, *U. rubicunda* (*Lendemer 5782*, NY). Scales = 1.0 mm in B, D, F; 0.5 mm in A, C, E.

Usnea fragilescens Lynge, Vid. Selsk. Skr. I. M. –N. Kl. 7: 230 (1921). Description: Clerc 2007. Substrate: bark. World distribution: Europe, North and South America. CINP distribution: SC, SR.

Plate 21, Fig. B.

NOTES. – *Usnea fragilescens* is common along the central coast of California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, summit of Black mountain, on *Quercus tomentella*, *Knudsen 7691* (UCR; det. Lendemer).

Usnea fulvoreagens (Räsänen) Räsänen, Lich. Fenn. Exs. No. 13 (1935). Description: Clerc 2007. Substrate: bark. World distribution: Europe, North America. CINP distribution: SC.

PLATE 21, FIG. C.

NOTES. – *Usnea fulvoreagens* is especially common along the central California coast. It occurs on Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Western Pines, on oak, *Bratt 3300-B* (ASU; det. Clerc).

Usnea glabrata (Ach.) Vainio, Ann. Acad. Sci. Fenn., Ser. A4, 6: 7 (1915). Description: Clerc 2007. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Usnea glabrata* is infrequent along the California coast. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, along Ridge Road, on *Ribes, Bratt 1478* (ASU; det. Clerc).

Usnea hirta (L.) F.H. Wigg., Prim. Fl. Holsat.: 91 (1780). Description: Clerc 2007. Substrate: bark, rarely rock. World distribution: cosmopolitan. CINP distribution: SC.

PLATE 21, FIG. D.

NOTES. – *Usnea hirta* is frequent in California, especially in the mountains. It occurs on Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Centinella gate, on *Quercus agrifolia, Bratt s.n.* (ASU; det. Clerc).

Usnea lapponica Vainio, Meddeland. Soc. Fauna Fl. Fenn. 48: 173 (1925). Description: Clerc 2007. Substrate: bark. World distribution: Asia, Europe, North America. CINP distribution: SC, SM, SR.

Plate 21, Fig. E.

NOTES. – *Usnea lapponica* is infrequent in California especially in the mountains. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Black Mountain, on *Quercus pacifica, Clerc s.n. & Bratt* (ASU).

Usnea mutabilis Stirton, Naturalist (Perth) 6: 107 (1881). Description: Clerc 2007. Substrate: bark. World distribution: Europe, North America. CINP distribution: SC.

NOTES. – *Usnea mutabilis* occurs on the central coast of California as well as on the Channel Islands. It is rare on the north Channel Islands, known only from Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Christi Pines, on *Pinus muricata, Clerc s.n. & Bratt* (ASU).

Usnea rubicunda Stirton, Naturalist (Perth) 6: 102 (1881). Description: Clerc 2007. Substrate: bark. World distribution: Asia, Africa, Europe, North and South America. CINP distribution: SC, SM, SR.

PLATE 21, FIG. F.

NOTES. – *Usnea rubicunda* is common along the central California coast. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, on *Baccharis*, *Knudsen 6713* (NY, UCR; det. Lendemer).

Usnea scabrata Nyl., Flora 58: 103 (1875). Description: Clerc 2007. Substrate: bark. World distribution: Asia, Europe, North America. CINP distribution: SC.

NOTES. – *Usnea scabrata* is common on the central California coast. It occurs on Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Centinela Gate, on *Quercus agrifolia, Bratt 1049* (ASU; det. Clerc).

Usnea subfloridana Stirton, Naturalist (Perth) 6: 294 (1882). Description: Clerc 2007. Substrate: bark. World distribution: Asia, Africa, Europe, North America. CINP distribution: SC, SR.

NOTES. – *Usnea subfloridana* is common in California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, above Chinese harbor, on *Pinus muricata*, *Knudsen 8533* (NY, UCR; det. Lendemer).

Usnea subscabrosa Nyl. *ex* Motyka, Lich. Gen. Usnea Stud. Monogra. Pars. Syst. 2: 313 (1937). Description: Clerc 2007. Substrate: bark. World distribution: Africa, Europe, North America. CINP distribution: SC.

NOTES. – *Usnea subscabrosa* is relatively rare in California, occurring from San Diego to Point Reyes. It occurs on Santa Cruz Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Christy Pines, on *Pinus muricata*, *Clerc s.n. & Bratt* (ASU).

Vahliella californica (Tuck.) P.M. Jørg., Lichenologist 40(3): 223 (2008). Description: Jørgensen 2004a (as *Fuscopannaria californica*). Substrate: soil. World distribution: North America. CINP distribution: SC.

NOTES. – *Vahliella californica* reaches the southern limit of its range in southern California and actually appears to be rare in California, despite its name. Like many cyanolichens, it is more frequent from northern California to British Columbia. In CINP it is known from a single collection that was made on Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, along the ridge to Ragged Mountain, *Nash 32380* (ASU; det. Jørgensen).

Vahliella labrata (P.M. Jørg.) P.M. Jørg., Lichenologist 40: 224 (2008). Description: Jørgensen 2005 (as *Fuscopannaria labrata*). Substrate: soil, rock. World distribution: North America (California endemic). CINP distribution: SC.

NOTES. – *Vahliella labrata* was described from two collections made by C. Bratt on Santa Cruz Island, both from Coches Prietos. It is also rare in the Santa Monica Mountains, where it is known from two sterile collections, one found in shade in Malibu Canyon on rock, the other on soil over volcanic rock in the Conejo Open Space (*Knudsen 7145, 10696,* UCR). The species is easily identified by its blue soredia in labriform soralia with the underside of lobes a beautiful blue color.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Coches Prietos, *Bratt 6257* (SBBG; det. Jørgensen).

Vahliella leucophaea (Vahl.) P.M. Jørg., Lichenologist 40: 224 (2008). Description: Jørgensen 2004a (as *Fuscopannaria leucophaea*). Substrate: soil. World distribution: temperate northern hemisphere. CINP distribution: SC.

NOTES. – *Vahliella leucophaea* is a common montane species in western North America. It occurs in biological soil crusts on Santa Barbara and Santa Cruz Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Central Valley, on soil, *Bratt 3463* (SBBG).

Verrucaria adelminienii Zschacke, Rabenh. Krypt.-Flora 9: 160 (1933). Description: Breuss 2007. Substrate: calcareous rock. World distribution: Europe and North America. CINP distribution: SR.

NOTES. – *Verrucaria adelminienii* is known in California only from Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on Monterey shale, *Knudsen 7356 & Baguskus* (UCR).

Verrucaria aspecta Breuss, Lichen Flora of the Greater Sonoran Desert Region 3: 343 2007. Description: Breuss 2007. Substrate: non-calcareous rock. World distribution: North America (California endemic). CINP distribution: SR (endemic).

NOTES. – *Verrucaria aspecta* is endemic to Santa Rosa Island where it is apparently rare.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, top of East Point, on rock, *Knudsen et al. 8840.2* (UCR).

Verrucaria calkinsiana Servít, Stud. Bot. Čech. 11: 107 (1950). Description: Breuss 2007. Substrate: non-calcareous rock, sandstone. World distribution: North America. CINP distribution: SM, SR, WA.
PLATE 22, FIG. B.

NOTES. – *Verrucaria calkinsiana* occurs in southern California in the Santa Ana and Santa Monica Mountains and on West Anacapa, San Miguel, and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, Green Mountain, on sandstone, *Nash 41448* (ASU; det. Breuss).

Verrucaria cetera Breuss, Ann. Naturhist. Mus. Wien 100B: 674 (1998). Description: Breuss 2007. Substrate: juvenile parasite on *Staurothele*, developing an independent thallus, on calcareous rock and sandstone. World distribution: North America. CINP distribution: SM.

NOTES. – *Verrucaria cetera* is rare in California where it is known from only one verified collection from San Miguel Island.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, Green Mountain, on sandstone, *Nash 41414* (ASU; det. Breuss).

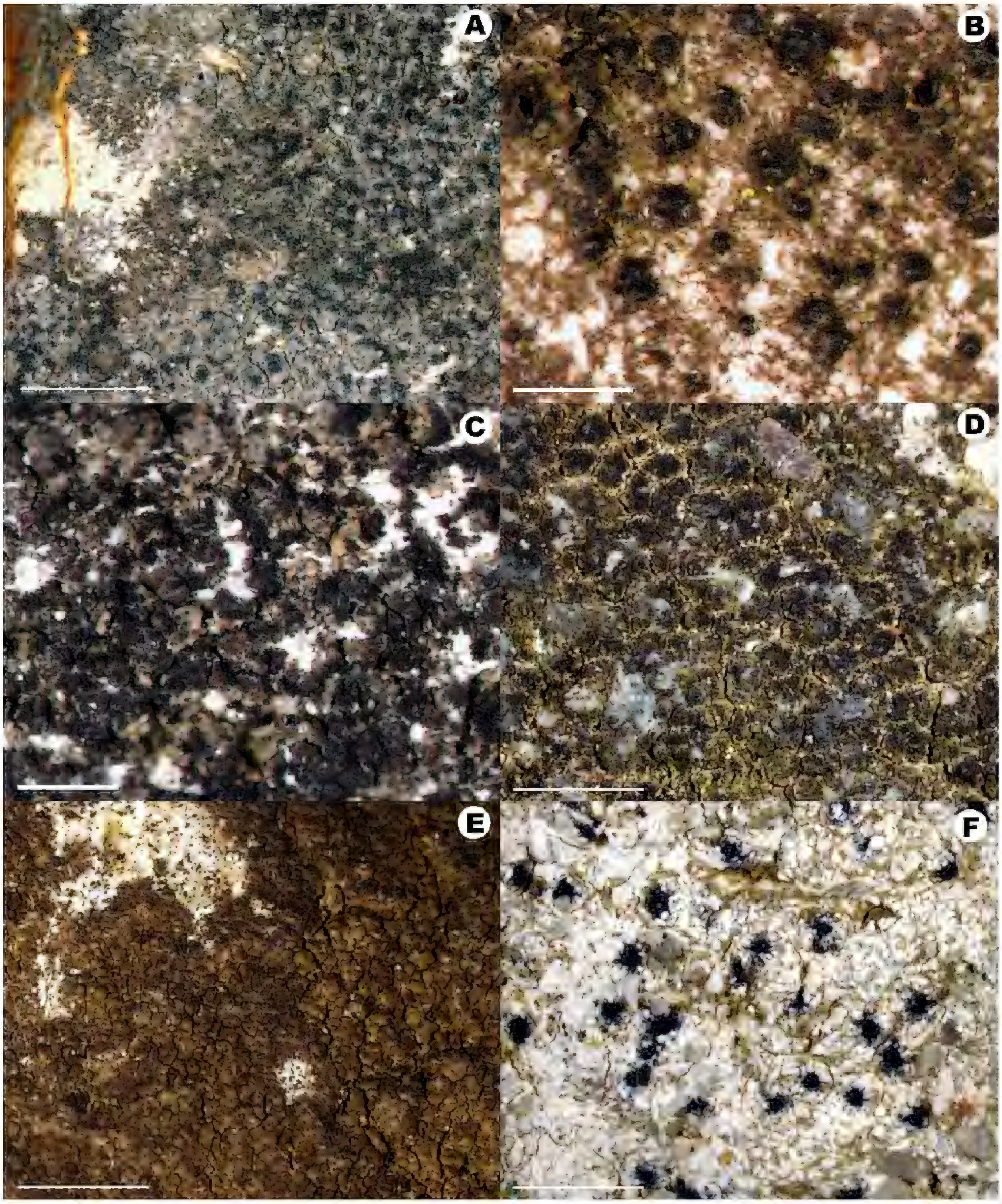

Plate 22, A, *Placidium boccanum* (*Knudsen 10455.2*, UCR). B, *Verrucaria calkinsiana* (*Knudsen 5611*, UCR). C, *V. furfuracea* (*Knudsen 6702*, UCR). D, *V. fusca* (*Knudsen 6134,* UCR). E, *V. fuscoatroides* (*Knudsen 6177.2,* UCR). F, *V. muralis* (*Lendemer 6699*, NY). Scales = 1.0 mm in A, B, D-F; 0.5 mm in C.

Verrucaria floerkeana Dalla Torre & Sarnth., Die Flechten von Tirol, Vorarlberg und Liechtenstein: 524 (1902). Description: Breuss 2007. Substrate: non-calcareous rock and sandstone. World distribution: Europe, North America. CINP distribution: SC, SM.

NOTES. – *Verrucaria floerkeana* occurs along the central coast of California and on the Channel Islands. It occurs on San Miguel and Santa Cruz Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, the Gangplank, on sandstone, *Nash 41098* (ASU; det. Breuss).

Verrucaria furfuracea (B. de Lesd.) Breuss, Lichen Flora of the Greater Sonoran Desert Region 3: 354 (2007). Description: Breuss 2007. Substrate: calcareous rock, concrete. World distribution: Europe, North America. CINP distribution: SM, SR.

PLATE 22, FIG. C.

NOTES. – *Verrucaria furfuracea* is frequent in southern California. It can be found on concrete and is often sterile. The species is abundant on caliche on San Miguel Island and also occurs on Santa Rosa Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, trail to Caldwell Point, on exposed caliche, *Knudsen 6728* (UCR).

Verrucaria fusca Pers. *ex* Ach., Lich. Univ.: 291 (1810). Description: Breuss 2007. Substrate: calcareous rock, non-calcareous rock in seasonal streams. World distribution: Europe, North America. CINP distribution: SR.

PLATE 22, FIG. D.

NOTES. – *Verrucaria fusca* is common in southern and central California especially on drainages, seeps, and on rocks in seasonal streams. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Sandy Point, *Wetmore 73645* (ASU; det. Breuss).

Verrucaria fuscoatroides Servít, Sborn. Národ. Mus. Praze 5 B, 9, Bot. 3: 25 (1949). Description: Breuss 2007. Substrate: non-calcareous or slightly calcareous rock. World distribution: Europe, North America. CINP distribution: SR.

PLATE 22, FIG. E.

NOTES. – *Verrucaria fuscoatroides* has a conspicuous brown thallus and is common in southern California. In her excellent revision of *Verrucaria* in Poland, Krzewicka (2012) suggests that *V. fuscoatroides* may be a synonym of *V. nigroumbrina* (A. Massal.) Servít. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on rock, *Knudsen 7590* (UCR).

Verrucaria mimicrans Servít, Stud. Bot. Čech. 11: 114 (1950). Description: Breuss 2007. Substrate: limestone and sandstone. World distribution: Europe, North America. CINP distribution: SM, SR.

NOTES. – *Verrucaria mimicrans* is infrequent in southern and central California. It occurs on San Miguel and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, San Miguel Island, on caliche, *Nash 41131* (ASU; det. Breuss).

Verrucaria muralis Ach., Meth. Lich.: 115 (1803). Description: Breuss 2007. Substrate: calcareous rock. World distribution: Africa, Asia, Australia, Europe, North America. CINP distribution: SM, SR.

PLATE 22, FIG. F.

NOTES. – *Verrucaria muralis* is frequent on calcareous substrates in western North America. It occurs on caliche on San Miguel and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, Green Mountain, on sandstone, *Nash 41450* (ASU; det. Breuss.)

Verrucaria othmarii K. Knudsen & L. Arcadia, nom. nov. pro. *V. rupicola* (B. de Lesd.) Bruess non *V. rupicola* (L.) Humb.
Mycobank# MB 801798.

Endopyrenium rupicola B. de Lesd., Ann. Cryptog. Exot. 5: 100 (1932). TYPE: **U.S.A. NEW MEXICO:** Environs de Las Vegas, calcicole, *A. Brouard s.n.* (hb. B de Lesdain [n.v.], presumed destroyed). NEOTYPE: **U.S.A. CALIFORNIA.** VENTURA CO.: Point Magu State Park, Sycamore Canyon, 34°8'3"N 118°58'54"W, 173 m, on sandstone boulder, ii.vi.2009, *Knudsen 11234 & Sagar* (LI, neotype [**designated here!**]; UCR, isoneotype).
Dermatocarpon rupicola (B. de Lesd.) Zahlbr., Catal. Lich. Univ. 10: 65 (1938).
Verrucaria rupicola (B. de Lesd.) Breuss, Lichen Flora of the Greater Sonoran Desert Region, 3: 372 (2007[2008]), *nom. illeg.* non *Verrucaria rupicola* (L.) Humb., Fl. Friberg. 44 (1793).

ETYMOLOGY. – The species is named in honor of Othmar Breuss (b. 1955) for his outstanding contributions to the study of Verrucariaceae and in thanks for his continuing assistance in our study of the California lichen biota.

NOTES. – An neotype is selected for *Verrucaria othmarii* because, as with many Brouard types in the herbarium of Bouly de Lesdain, it is presumed to have been destroyed during the bombing of Dunkirk in World War II. For a description of the taxon refer to Breuss 2007 (as *Verrucaria rupicola*).

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, Scorpion Canyon, on shale, *Knudsen 11941.1* (UCR).

Verrucaria papillosa Ach., Lich. Univ.: 286 (1810). Description: Breuss 2007. Substrate: calcareous rock. World distribution: Asia, Europe, Tasmania, North America. CINP distribution: SM, SR.

NOTES. – *Verrucaria papillosa* is frequent in western North America. It occurs on San Miguel and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Nidever Canyon, on caliche, *Knudsen 6879* (UCR).

Verrucaria rufofuscella Servít, Stud. Bot. Čech. 7: 79 (1950). Description: Breuss 2007. Substrate: sandstone and shale. World distribution: Europe, North America. CINP distribution: SR.

PLATE 23, FIG. A.

NOTES. – *Verrucaria rufofuscella* has a distinctive rugulose reddish brown areolate thallus and is apparently infrequent in California. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Quemada Canyon, *Knudsen 8681 & Kocourková* (UCR)

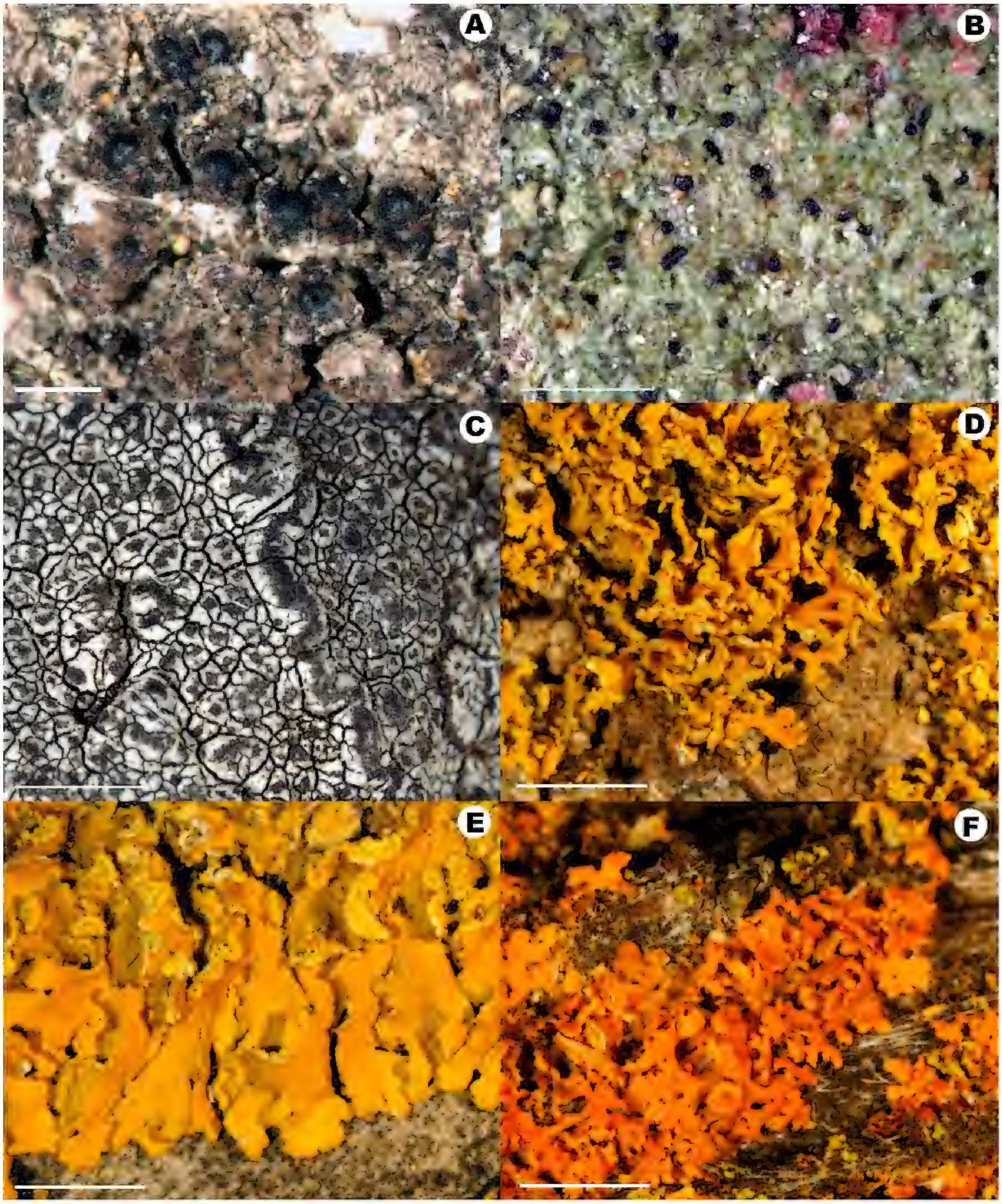

Plate 23, A, *Verrucaria rufofuscella* (*Knudsen 3982*, UCR). B, *V. sandstedei* (*Knudsen 11373*, UCR). C, *V. subdivisa* (*Knudsen 11530*, UCR). D, *Xanthomendoza candelaria* (*Knudsen 10916,* UCR). E, *X. fallax* (*Follett s.n.,* NY). F, *X. fulva* (*Conrad 6800*, NY). Scales = 1.0 mm in B-F; 0.5 mm in A.

Verrucaria sandstedei B. de Lesd., Bull. Soc. Bot. Fr. 58: 662 (1911). Description: Orange et al. 2009. Substrate: non-calcareous rock. serpentine. World distribution: Europe, North America. CINP distribution: SR.

PLATE 23, FIG. B.

NOTES. – *Verrucaria sandstedei* is an intertidal lichen that is infrequent along the California coast from Orange County to Point Lobos (Knudsen and Kocourková 2010b). It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Lobo Canyon, on rock, *Knudsen 11373* (UCR).

Verrucaria subdivisa Breuss, Lichen Flora of the Greater Sonoran Desert Region 3: 373 (2007). Description Breuss 2007. Substrate: non-calcareous rock. World distribution: North America. CINP distribution: EA, SB, SC, SM, SR, WA.

Plate 23, Fig. C.

NOTES. – *Verrucaria subdivisa* is a gray pruinose species that is common along the California coast. It is common on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, road to Carrington, on caliche, *Knudsen 8871 & Chaney* (UCR).

Verrucaria viridula (Schrader) Ach., Method. Lich. Suppl.: 16 (1803). Description: Breuss 2007. Substrate: calcareous and non-calcareous rock. World distribution: Africa, Europe, North America. CINP distribution: SR.

NOTES. – *Verrucaria viridula* is apparently infrequent in California. Older specimens identified using this name often represent other species. It occurs on Santa Rosa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Bee Canyon, on exposed petrified oyster bed, *Knudsen et al. 10516* (UCR).

***Vouauxiella lichenicola** (Linds.) Petr. & Sydow, Beih. Repert, Nov. Spec. Regeni Veg. 42: 484 (1927). Description: Diederich 2004f. Substrate: *Lecanora* species. World distribution: Africa, Europe, North America. CINP distribution: SR.

NOTES. – *Vouauxiella lichenicola* occurs on *Lecanora* species and is frequent in California (Kocourkova et al. 2012). It is only known from Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO. Santa Cruz Island, Sauces Gate area, on *Lecanora*, *Tucker 35848* (SBBG; det. Diederich).

Wahlenbergiella striatula (Wahlenb.) Gueidan & Thüs, Taxon 58(1): 200 (2009). Description: Orange et al. 2009. Substrate: rock in intertidal zone. World distribution: cosmopolitan. CINP distribution: WA.

NOTES. – *Wahlenbergiella striatula* is apparently rare along the California coast. *Verrucaria melas* Herre, described from San Francisco, is a synonym (Knudsen 2012). It occurs on West Anacapa Island in CINP.

Voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, below Rat Rock, *Knudsen 10685 & Kocourková* (UCR; det. Breuss).

Waynea californica Moberg, Lichenologist 22: 249 (1990). Description: Moberg 2002d. Substrate: bark, especially on oaks. World distribution: North America. CINP distribution: SC, SR.

NOTES. – *Waynea californica* is probably more common than the literatute indicates, at least in the coastal ranges from Orange County to Monterey County of California. It also occurs in Oregon (B. McCune. pers. comm.) In CINP the species occurs on Santa Cruz and Santa Rosa Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, ridge above Chinese Harbor, on *Quercus agrifolia, Knudsen et al. 8546* (UCR).

Xanthomendoza fallax (Hepp *ex* Arnold) Søchting, Kärnefelt & S.Y. Kondr., Mitt. Inst. Allg. Bot. Hamburg 30: 237 (2002). Description: Lindblom 2004a. Substrate: bark, often on rock especially in Mojave Desert. World distribution: Asia, Europe, North America. CINP distribution: SC, SR.

PLATE 23, FIG. D.

NOTES. – *Xanthomendoza fallax* is common in California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, below Black Mountain, on chaparral, *Ryan 31634* (ASU; det. Nash).

Xanthomendoza fulva (Hoffm.) Søchting, Kärnefelt & S. Kondr., Mitt. Inst. Allg. Bot. Hamburg 30: 237 (2002). Description: Lindblom 2004a. Substrate: bark, rarely on rock. World distribution: Asia, Europe, North America.

PLATE 23, FIG. E.

NOTES. – *Xanthomendoza fulva* is common in California. It is apparently rare on San Miguel and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, on sandstone, *Nash 41169-B* (ASU).

Xanthomendoza oregana (Gyelnik) Søchting, Kärnefelt & S. Kondr., Mitt. Inst. Allg. Bot. Hamburg 30: 237 (2002). Description: Lindblom 2004a. Substrate: bark, rarely on detritus, soil, rock. World distribution: Asia, North America. CINP distribution: SC, SM, SR.

NOTES. – *Xanthomendoza oregana* is common in California. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Sierra Pablo ridge, on shrub, *Nash 32820* (ASU)

Xanthoparmelia commonii Elix & Nash, Mycotaxon 71: 417 (1999). Description: Nash and Elix 2004. Substrate: on non-calcareous pebbles and adjacent soil. World distribution: North America. CINP distribution: SR.

NOTES. – *Xanthoparmelia commonii* is rare in California and is known only from the Channel Islands. It occurs on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, off Telephone Road, on pebbles, *Knudsen et al.* 7699.1 (UCR)

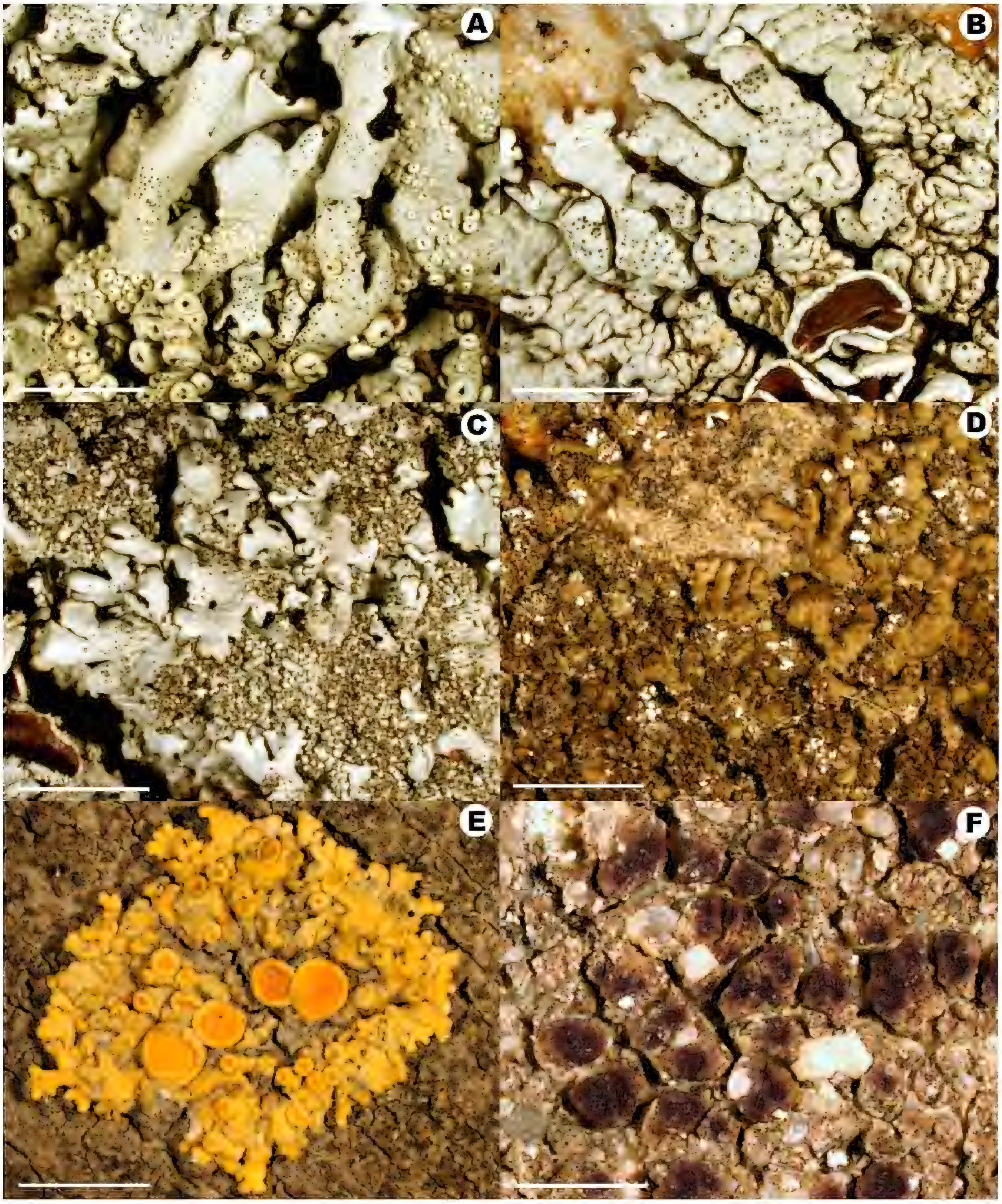

Plate 24, A, *Xanthoparmelia cumberlandia* (*Lendemer 14873*, NY). B, *X. lineola* (*Lendemer 14931*, NY). C, *X. mexicana* (*Lendemer 14730*, NY). D, *X. verruculosa* (*Lendemer 11394,* UCR). E, *X. tenax* (*Underwood s.n.*, NY). F, *Myriospora hassei* (*Knudsen 707*, UCR). Scales = 2.0 mm in A-C; 1.0 mm in D-F.

Xanthoparmelia cumberlandia (Gyelnik) Hale, Phytologia 28: 487 (1974). Description: Nash and Elix 2004. Substrate: non-calcareous rock, soil. World distribution: Europe (?), North and South America. CINP distribution: SC, SR.

PLATE 24, FIG. A.

NOTES. – *Xanthoparmelia cumberlandia* is common throughout California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Torrey Pine grove, on volcanic breccia, *Knudsen 7431.2 & Baguskus* (NY, UCR)

Xanthoparmelia lineola (E.C. Berry) Hale, Phytologia 28: 488 (1974). Description: Nash and Elix 2004. Substrate: non-calcareous rock, soil. World distribution:cosmopolitan. . CINP distribution: SC, SR.

PLATE 24, FIG. B.

NOTES. – *Xanthoparmelia lineola* is common in California. It appears to be infrequent on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, along ridge to Ragged Mountain, on rock, *Nash 32378-B* (ASU).

Xanthoparmelia mexicana (Gyelnik) Hale, Phytologia 28: 487 (1974). Description: Nash and Elix 2004. Substrate: non-calcareous rock, rarely on soil. World distribution: cosmopolitan. CINP distribution: SC, SR.

PLATE 24, FIG. C.

NOTES. – *Xanthoparmelia mexicana* is common throughout California. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Quemada Canyon, on rock, *Knudsen 8688 & Kocourková* (UCR).

Xanthoparmelia neotaractica Hale, Mycotaxon 20: 76 (1984). Description: Nash and Elix 2004. Substrate: soil. World distribution: North and South America. CINP distribution: SR.

NOTES. – *Xanthoparmelia neotaractica* is a rare terricolous species in southern California that apparently requires a humid microhabitat. It occurs on Santa Rosa Island in CINP

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on soil, *Knudsen 10600* (UCR).

Xanthoparmelia standaertii (Gyelnik) Hale, Phytologia 28: 489 (1974). Description: Nash and Elix 2004. Substrate: soil. World distribution: North and South America. CINP distribution: SC, SR.

NOTES. – *Xanthoparmelia standaertii* occurs along the southern California coast. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Cherry Canyon, on soil, *Bratt 3379* (ASU, SBBG; det. Nash).

Xanthoparmelia subramigera (Gyelnik) Hale, Phytologia 28: 489 (1974). Description: Nash and Elix 2004. Substrate: non-calcareous rock. World distribution: Asia, Africa, North and South America. CINP distribution: SR, WA.

NOTES. – *Xanthoparmelia subramigera* is frequent in California but the populations are scattered. It is rare on West Anacapa and Santa Cruz Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, on rock, *Bratt 9198* (ASU, SBBG).

Xanthoparmelia verruculifera (Nyl.) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch, Taxon 53(4): 972 (2004). Description Esslinger 2002b (as *Neofuscelia verruculifera*). Substrate: usually non-calcareous rock, rarely on bark or moss. World distribution: Asia, Africa, Europe, North America. CINP distribution: SC, SR.

PLATE 24, FIG. D.

NOTES. – *Xanthoparmelia verruculifera* is common in California at all elevations. It occurs on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, below Black Mountain, on rock, *Knudsen 7659 & Baguskus* (UCR).

Xanthoria ascendens S.Y. Kondr., Lichenologist 29: 431 (1997). Lindblom 2004b. Substrate: bark, detritus. World distribution: North and South America. CINP distribution: EA, SM, SR, WA.

NOTES. – *Xanthoria ascendens* is only known in California from Anacapa, San Miguel, and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** VENTURA CO.: West Anacapa Island, common on *Leptosyne gigantea*, *Knudsen 10776* (UCR).

Xanthoria candelaria (L.) Th. Fr., Genera Heterol. Eur. Recog. 61 (1861). Description: Lindblom 2004b. Substrate: bark, rock, detritus. World distribution: cosmopolitan. CINP distribution: EA, SB, SC, SM, SR, WA.

PLATE 24, FIG. F.

NOTES. – *Xanthoria candelaria* is a common maritime species on the California coast. It is common on all of the Channel Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Dry Canyon, on rock, *Knudsen et al. 10522* (UCR).

Xanthoria elegans (Link) Th. Fr., Lich. Arct.: 69 (1860). Description: Lindblom 2004b. Substrate: rock. World distribution: cosmopolitan. CINP distribution: SR.

NOTES. – *Xanthoria elegans* is common in California but it is rare on Santa Rosa Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Sierra Pablo Ridge, on rock, *Wetmore 73768* (ASU, MIN).

Xanthoria parietina (L.) Th. Fr., Lich. Arct.: 69 (1860). Description: Lindblom 2004b. Substrate: bark, rock, detritus. World distribution: cosmopolitan. CINP distribution: SC.

NOTES. – *Xanthoria parietina* is rare in California, known from scattered coastal populations. In CINP it is known from a single collection from Santa Cruz Island.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Cruz Island, *Bratt 5724* (SBBG; det. Wetmore).

Xanthoria pollinarioides L. Lindblom & D.M. Wright, Lichen Flora of the Greater Sonoran Desert Region 2: 608 (2004). Description: Lindblom 2004b. Substrate: bark. World distribution: North America (California endemic). CINP distribution: SM.

NOTES. – *Xanthoria pollinarioides* occurs along the central coast of California. It is known from San Miguel Island in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: San Miguel Island, San Miguel Hill, on shrubs, *Nash 41197* (ASU; det. Lindblom).

Xanthoria polycarpa (Hoffm.) Th. Fr. ex Rieber, Jahresh. Ver. Vaterl. Kultur Württ. 42: 252 (1891). Description: Lindblom 2004b. Substrate: bark. World distribution: cosmopolitan. CINP distribution: SC, SR.

NOTES. – *Xanthoria polycarpa* is common in California and is infrequent on Santa Cruz and Santa Rosa Islands in CINP.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Rosa Island, Bee Canyon, on *Artemisia californica, Nash 32716* (ASU; det. Lindblom).

Xanthoria tenax L. Lindblom, J. Hattori Bot. Lab 83: 158 (1997). Description: Lindblom 2004b. Substrate: bark. World distribution: North America. CINP distribution: SB, SC, WA.

PLATE 24, FIG. E.

NOTES. – *Xanthoria tenax* is especially common in southern California where it occurs on coastal sage shrubs and chaparral. In CINP it occurs on West Anacapa, Santa Barbara, and Santa Cruz Islands.

Selected voucher. – **U.S.A. CALIFORNIA.** SANTA BARBARA CO.: Santa Barbara Island, on *Lycium californicum*, *Bratt 5152* (ASU; det. Lindblom).

EXCLUDED SPECIES

Acarospora rhabarbarina Hue, Lich. Morph. Et Anat.: 117 (1909). Description**:** Knudsen et al. 2008. Substrate: on rock and soil. World distribution: South America.

NOTES. – We no longer recognize *Acarospora rhabarbarina* as occurring in North America (Knudsen 2007a) and the identification of the specimen on soil reported from Santa Cruz Island has been revised to *A. socialis*.

Lecidella viridans (Flotow) Körber, Syst. Lich. Germ.: 242 (1855). Description: Knoph and Leuckert 2004. Substrate: non-calcareous rocks. World distribution: Europe, North America.

NOTES. – *Lecidella viridans* is a frequent species in western North America from eastern Arizona to Texas. The specimen identified by T.H. Nash as *L. viridians* from Santa Cruz Island and reported in Knoph and Leuckert (2004) is *L. stigmatea.*

Ochrolechia androgyna (Hoffm.) Arnold, Flora 68: 236 (1885). Description: Kukwa 2011. Substrate: bark. World distribution: Europe, North America.

NOTES. – The name *Ochrolechia androgyna* was probably misapplied to two specimens collected by T.H. Nash on Santa Cruz and Santa Rosa Islands (ASU). Though *O. androgyna* occurs in North America, it has only been verified as occurring in Alaska and Maine (Kukwa 2011). Specimens from California, including the Channel Islands, need to be revised in light of this recent taxonomic revision. Specimens from the mountains of southern California have been verified as *O. mahluensis* Räsänen (Knudsen 2012).

Ochrolechia parella (L.) A. Massal., Ric. Auton. Lich. Crost.: 32 (1852). Description: Kukwa 2011. Substrate: rock. World distribution: Africa, Asia, Europe.

NOTES. – *Ochrolechia parella* does not occur in North America. The report of *O. parella* from Santa Rosa Island (Roemer et al. 2004) refers to a specimen of *O. subpallescens* growing on rock. This phenomenon is common on the island and probably due to the reduction of suitable corticolous substrates from grazing.

CONCLUSION

We currently recognize 504 taxa (448 lichens, 48 lichenicolous fungi, 8 allied fungi) in152 genera, and 56 families as occurring in Channel Islands National Park. Further, we consider all of these to be native to the north Channel Islands. Ultimately, through the revision of herbarium specimens, taxonomic revisions of genera and species, new records from exploration, and the description of new species for science, we expect the total diversity to exceed 600 taxa. Seven species are endemic to Channel Islands National Park: *Arthonia madreana, Caloplaca obamae, Dacampia lecaniae, Lecania caloplacicola, Lecania ryaniana, Plectocarpon nashii,* and *Verrucaria aspecta.* At least 54 species, many of which occur in Mexico, are only known in California from Channel Islands National Park, though they may eventually be discovered on the mainland of California or on the southern Channel Islands (see Appendix One below). The most important biogeographic unit of the lichen flora represented in Channel Islands National Park are species endemic to the southwestern coast of North America and which are distributed primarily from Point Reyes south to Baja California Sur. Some of these occur only in California while others are found in both California and Mexico. The indicator genera of this biogeographical unit are *Niebla* and *Schizopelte.* This biogeographic unit contains at least 103 species (see Appendix Two below).

The inventory of lichen and lichenicolous fungi taxa in Channel Islands National Park is essential for resource management, for future floristic, taxonomic, systematic, and ecological studies, as well as for the monitoring of changes in the composition of the flora in the future. It is uncertain what the effects of global warming will be on Channel Islands National Park. Anthropogenic fires are a serious threat to the lichen flora of the islands due to the large number of rare species that could be extirpated. The removal of invasive plant species such as Ice Plant and the restoration of native shrubs and trees are opening new substrates for lichen colonization. The recovery of Channel Islands National Park from centuries of ranching and military use is already evident on all of the islands and inspires us with hope for the future of its fascinating biota.

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APPENDIX ONE - SPECIES ONLY KNOWN IN CALIFORNIA FROM CHANNEL ISLANDS NATIONAL PARK

Adelolecia sonorae
Arthonia gerhardii
Arthonia madreana
Arthonia subdispuncta
Arthrorhaphis aeruginosa
Bactrospora acicularis
Caloplaca obamae
Catillaria subviridis
Cercidospora cladoniicola
Dacampia lecaniae
Endocarpon petrolepidium
Endocarpon simplicatum
Harpidium nashii
Ingvariella bispora
Intralichen lichenicola
Lecania caloplacicola
Lecania ryaniana
Lecanographa aggregata
Lecanographa lyncea
Lecanographa lynceoides
Lecanora andrewii
Lecanora carneolutescens
Lecanora plumosa
Lecidella granulosula
Lichenostigma radicans
Marchandiomyces corallinus
Mycocalicium victoriae
Peltula corticola
Peltula farinosa
Pertusaria islandica

Pertusaria moreliensis
Pertusaria occidentalis
Pertusaria tejocotensis
Physcia millegrana
Physcia neglecta
Physcia subtilis
Physcia undulata
Placidium boccanum
Plectocarpon nashii
Pleopsidium chlorophanum
Polycoccum pulvinatum
Pseudosagedia aenea
Pseudosagedia cestrensis
Psora brunneocarpa
Rinodina brouardii
Roselliniella cladoniae
Seirophora californica
Stigmidium californicum
Toninia nashii
Toninia subtalparum
Tornabea scutellifera
Verrucaria adelminienii
Verrucaria aspecta
Verrucaria cetera
Xanthoria ascendens

APPENDIX TWO - SPECIES ENDEMIC TO COASTAL MEXICO AND/OR COASTAL CALIFORNIA FROM SONOMA COUNTY TO BAJA CALIFORNIA SUR

Acarospora robiniae
Adelolecia sonorae
Arthonia gerhardii
Arthonia infectans
Arthonia lecanactidea
Arthonia subdispuncta
Aspicilia pacifica
Bacidia corusans
Bacidina californica
Buellia capitis-regnum
Buellia christophii
Buellia pullata
Buellia ryannii
Caloplaca brattiae
Caloplaca catalinae
Caloplaca impolita
Caloplaca ludificans
Caloplaca obamae
Caloplaca stantonii
Caloplaca stipitata
Cladonia hammeri
Cladonia maritima
Cladonia nashii
Cyphelium brunneum
Dacampia lecaniae
Dactylospora pleiosperma
Dendrographa alectoroides

Dendrographa leucophaea
Dimelaena californica
Dimelaena weberi
Diploschistes aeneus
Dirina catalinariae
Endococcus thelommatis
Harpidium nashii
Heterodermia erinacea
Hypogymnia gracilis
Hypogymnia minilobata
Hypogymnia mollis
Hypogymnia schizidiata
Lecanactis californica
Lecanactis salicina
Lecania brunonis
Lecania caloplacicola
Lecania dudleyi
Lecania franciscana
Lecania pacifica
Lecania toninioides
Lecanographa brattiae
Lecanographa dimelaenoides
Lecanographa insolita
Lecanora albocaesiella
Lecanora brattiae
Lecanora californica
Lecanora demosthenesii
Lecanora pacifica
Lecanora substrobilina
Lecanora verrucariicola
Leprocaulon knudsenii
Leprocaulon santamonicae
Leprocaulon terricola
Megalaria columbiana
Mobergia angelica
Niebla ceruchoides
Niebla combeoides
Niebla isidiaescens
Niebla laevigata
Niebla polymorpha
Niebla procera
Niebla robusta
Paraschismatomma ochroleucum
Pertusaria brattiae
Pertusaria californica
Pertusaria islandica
Pertusaria lecanina
Pertusaria occidentalis
Physcia tenellula
Plectocarpon nashii
Protoparmelia ryaniana
Psora brunneocarpa
Rinodina herrei
Rinodina innata
Roccellina conformis
Schizopelte californica

Schizopelte crustosa
Schizopelte parishii
Seirophora californica
Sigridea californica
Skyttea tavaresiae
Sparria cerebriformis
Stigmidium californicum
Stigmidium epistigmellum
Stigmidium hesperium
Tephromela nashii
Thelomma santessonii
Toninia nashii
Toninia subtalparum
Topelia californica
Tremella nieblae
Usnea brattiae
Vahliella labrata
Verrucaria aspecta
Verrucaria subdivisa
Waynea californica
Xanthoria pollinarioides

APPENDIX THREE – MAPS OF CHANNEL ISLANDS NATIONAL PARK AND ITS CONSTITUENT ISLANDS INCLUDING RELEVANT PLACE NAMES

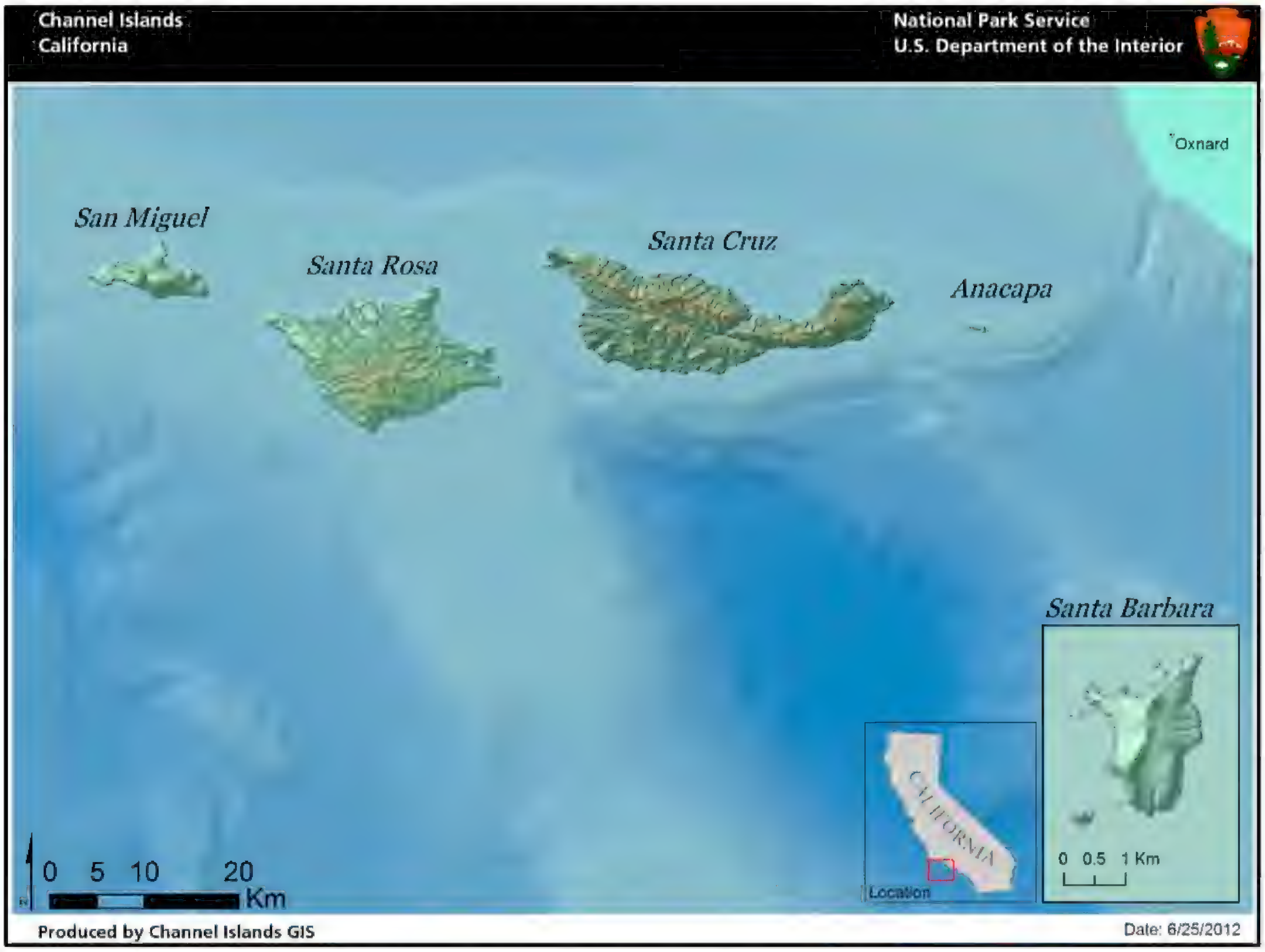

Plate 25, map of Channel Islands National Park illustrating the positions of its constituent islands (with Santa Barbara Island included as an inset).

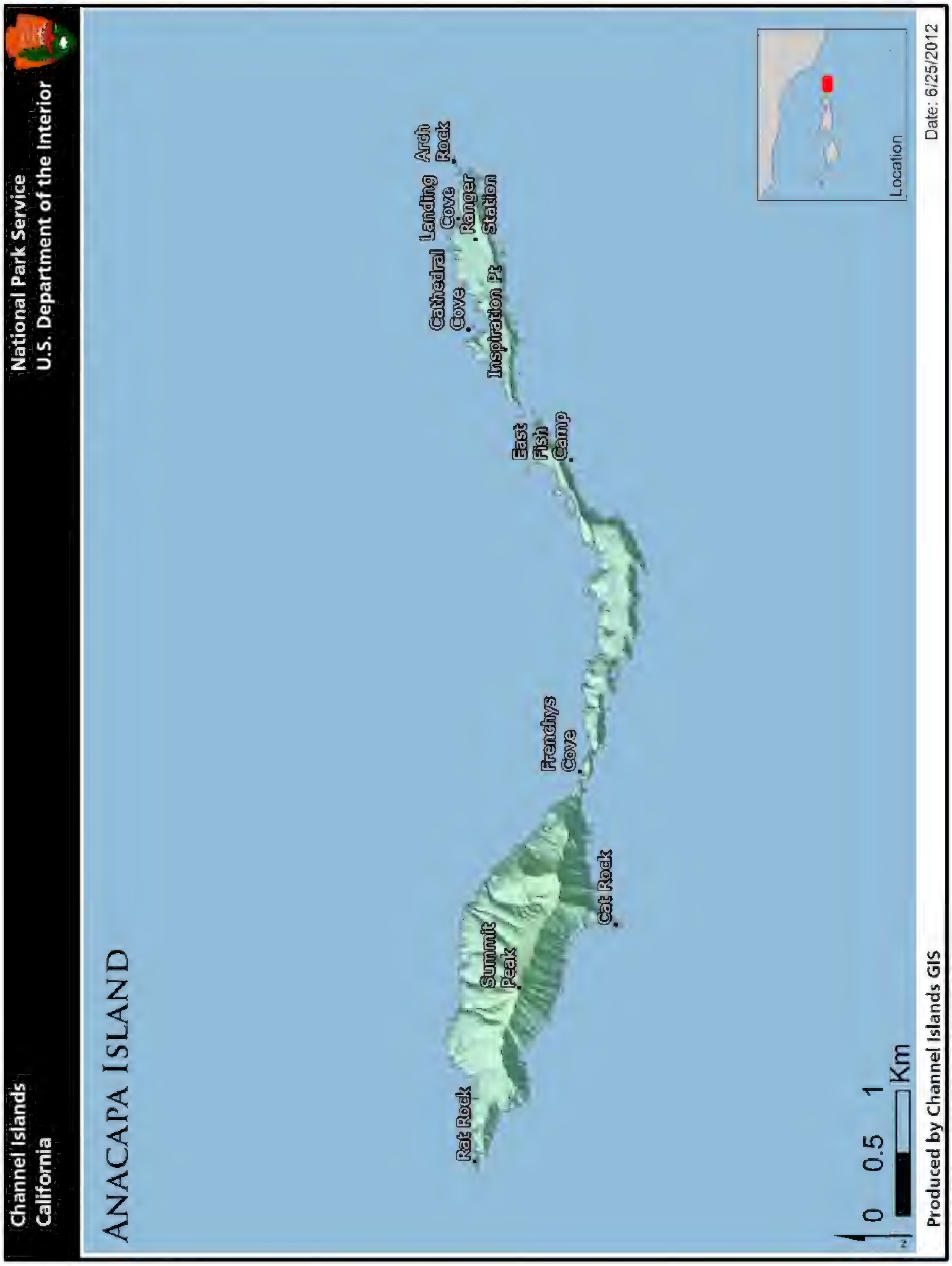

Plate 26, map of Anacapa Island (A) which is composed of three subunits (East Anacapa (EA), Middle Island (MI), and West Anacapa (WA)) and referred to as such in the text above.

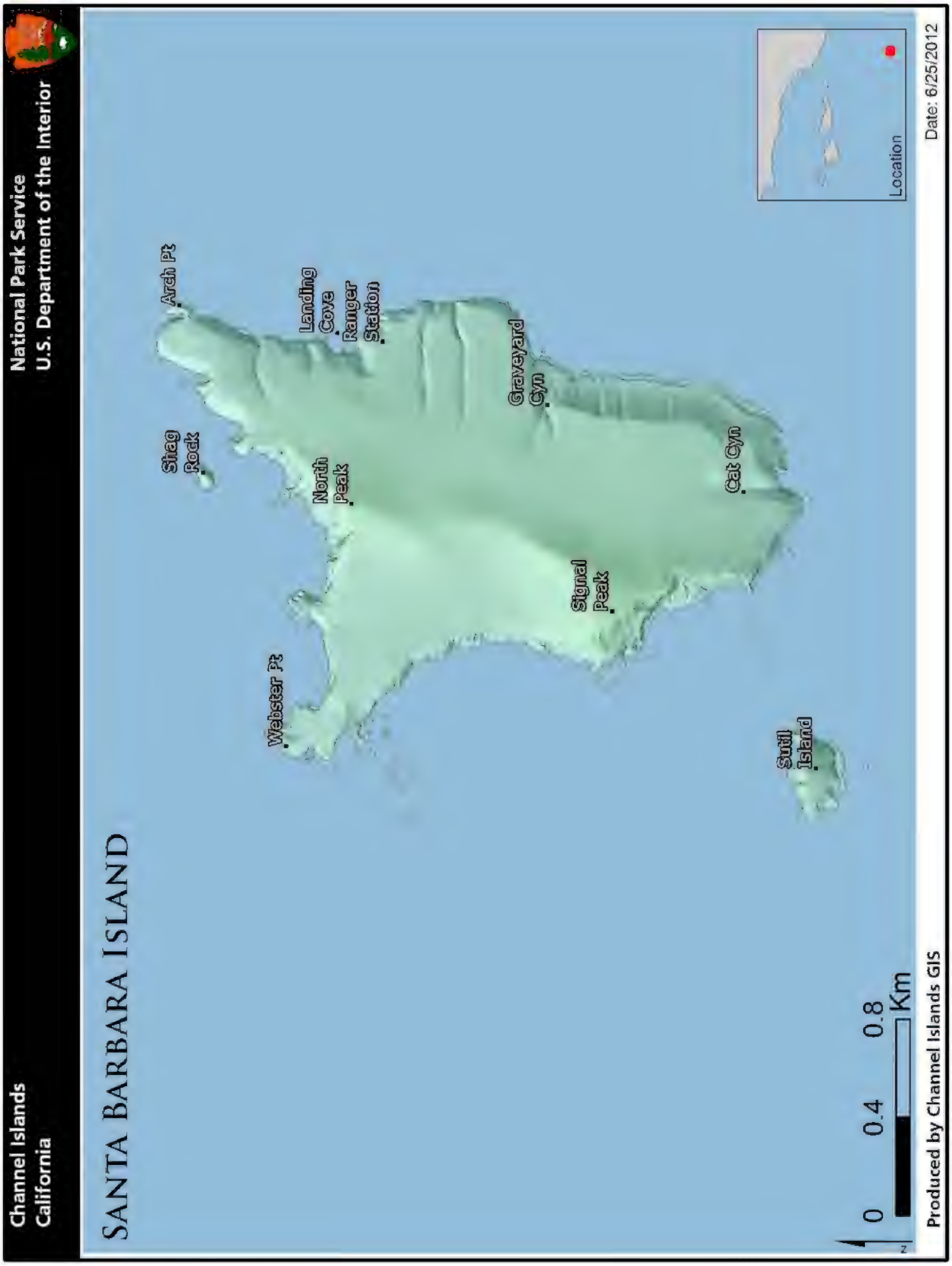

Plate 27, map of Santa Barbara Island (SB).

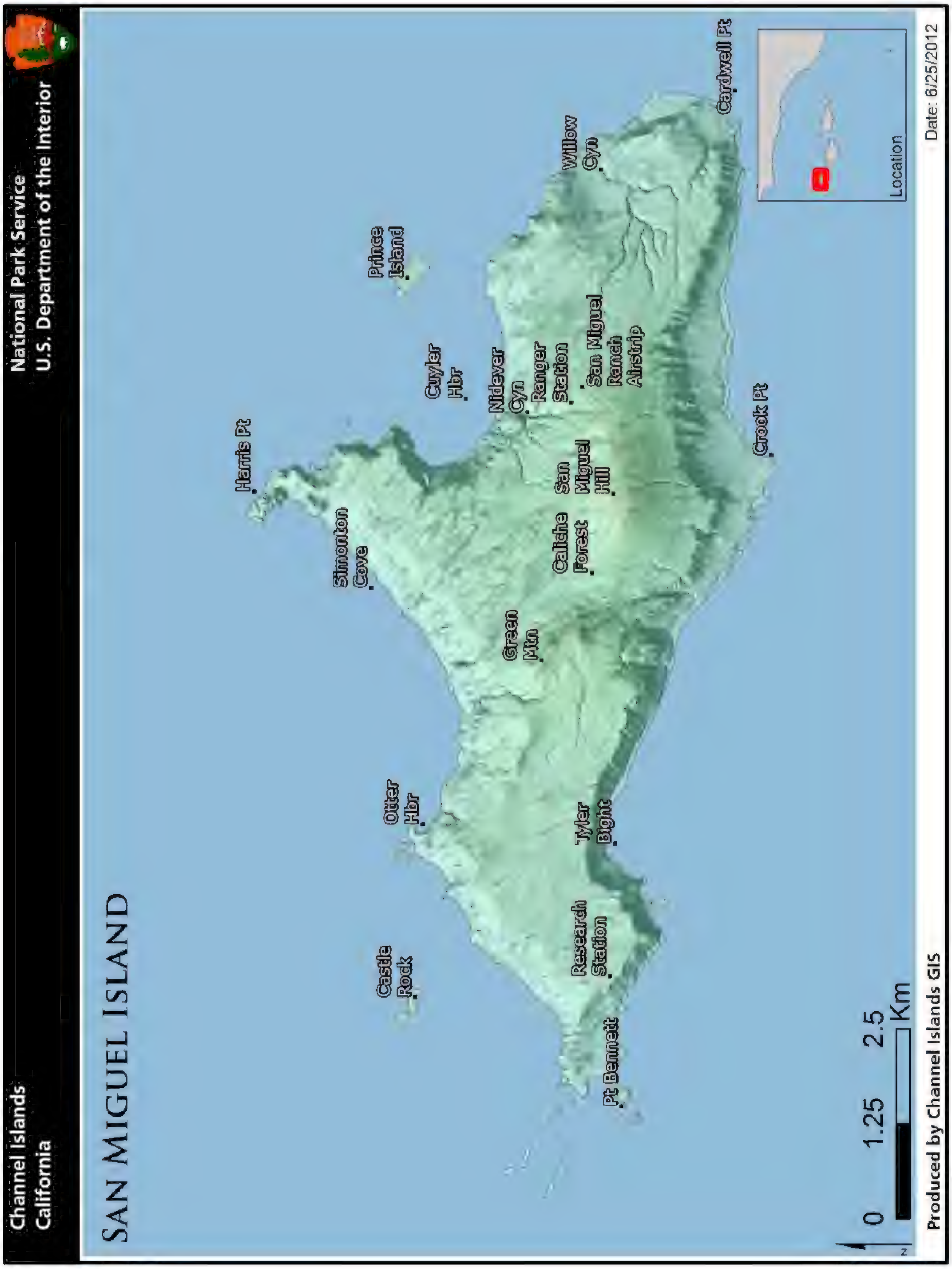

Plate 28, map of San Miguel Island (SM).

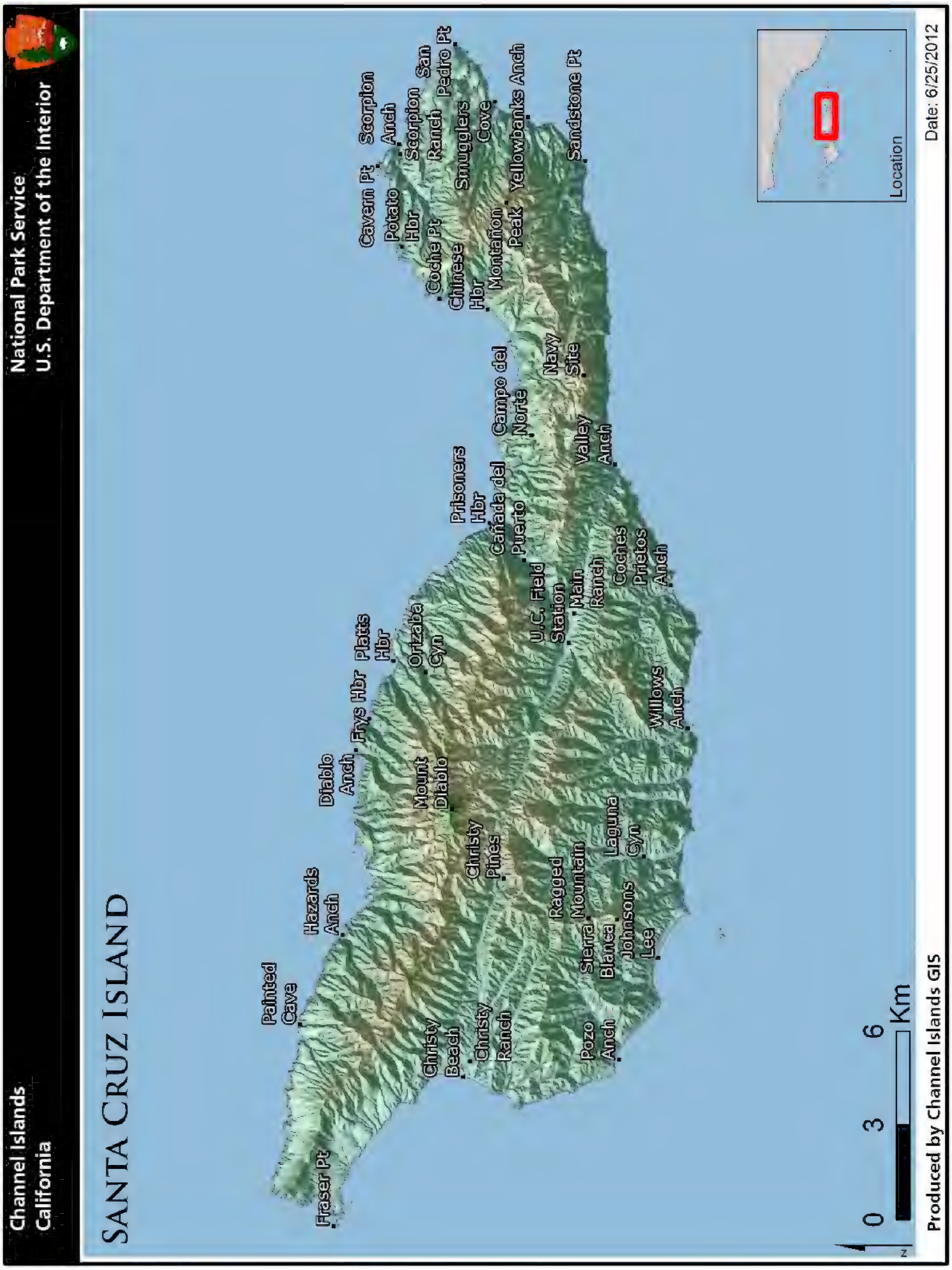

Plate 29, map of Santa Cruz Island (SC).

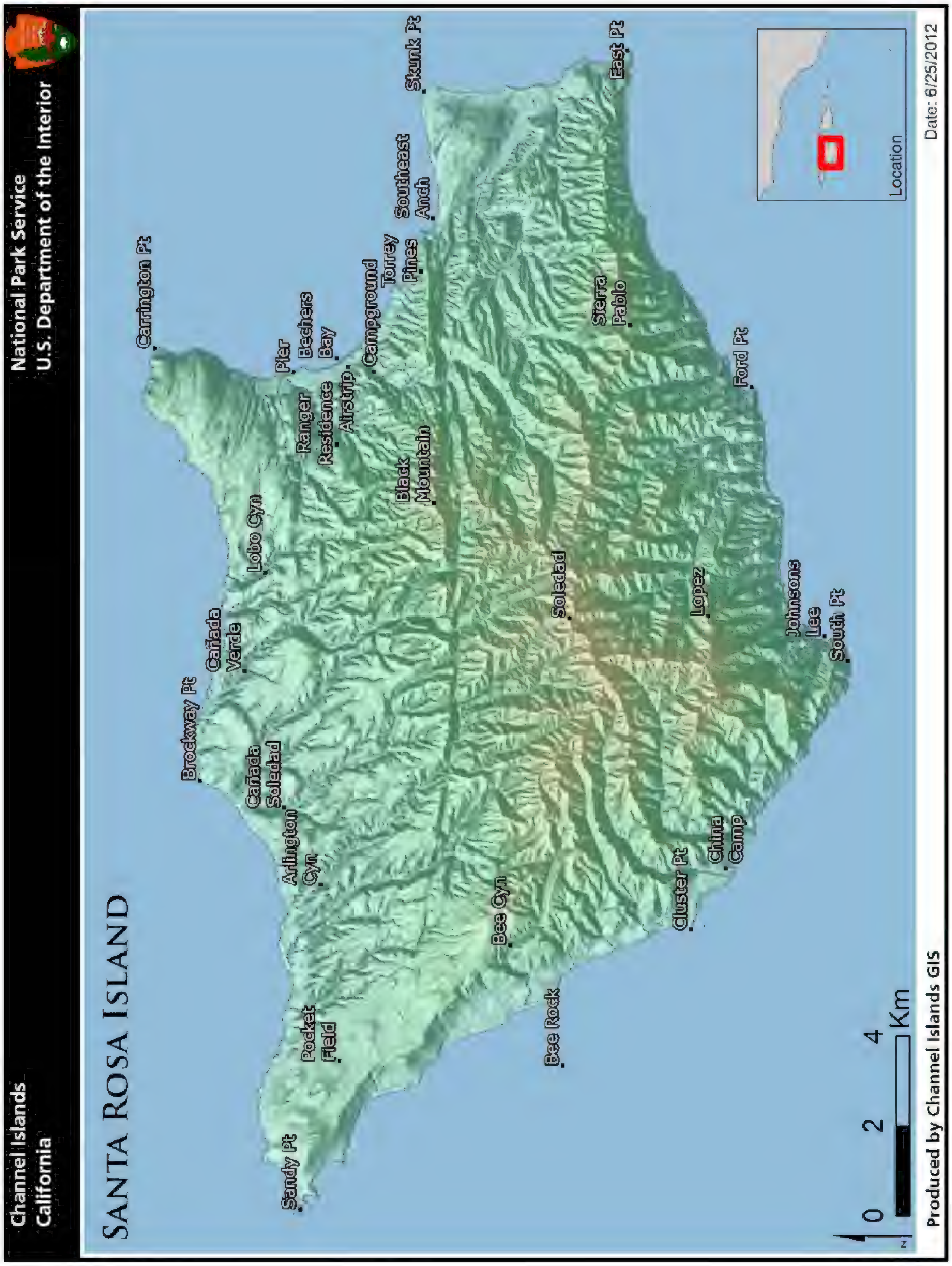

Plate 30, map of Santa Rosa Island (SR).

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Erratum: *Placidium boccanum* does not occur in North America

KERRY KNUDSEN[1] AND JANA KOCOURKOVÁ[2]

In the recently published *Annotated Checklist of Lichens, Lichenicolous and Allied Fungi of Channel Islands National Park* (Knudsen & Kocourková 2012 *in* Opuscula Philolicheum 11: 145-302) the authors reported *Placidium boccanum* (Servít) Breuss for the first time from North America. This report was based on a miscommunication during editing in which *Verrucaria boccana* Servít was interpreted as *P. boccanum*. This error is corrected here. The name *V. boccana* (Servít 1949 *in* Acta Mus. Nat. Pragae, 5B(9), Bot. no. 3: 17) should replace *P. boccanum* on pages 45, 154, 247 (plate 22), and 295 in the aforementioned publication. *Verrucaria boccana* is reported new for North America, not *P. boccanum*.

Verrucaria boccana is distinguished from its congeners by an areolate thallus and protruding hemispherical perithecia about 0.2 mm in diameter, with a thin exciple extending to the base, spores 14-22 x 6-7 µm, and a distinct fimbriate prothallus around the margins typical of the *V. fusca* complex. The identification of our material was made by Othmar Breuss.

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A worldwide key for the genus *Parmelinopsis* Elix & Hale (Parmeliaceae; Lichenized Ascomycetes)

MICHEL N. BENATTI[1]

ABSTRACT. – A worldwide key, based on the literature and specimens from SP herbarium, is presented for all 25 currently accepted species of *Parmelinopsis*.

KEYWORDS. – marginal cilia, *Hypotrachyna*, gyrophoric acid, horrescens complex.

INTRODUCTION

Parmelinopsis Elix and Hale (1987) is a segregate of the ciliate parmelioid lichen genus *Parmelina* Hale (Hale 1974), characterized by typically greenish gray thalli containing cortical atranorin and chloroatranorin, medullary orcinol depsides and β-orcinol depsidones, 0.5−5.0 mm wide truncate lobes with simple cilia, a white medulla, ivory, brown or black lower surface with naked brown margins, simple to sparsely dichotomously branched concolorous rhizines, ellipsoid ascospores 12−20 × 8−12 µm, and cylindrical or bifusiform conidia 3−5 µm in length (Elix 1993, Elix & Hale 1987).

The genus belongs to a well supported clade in the family Parmeliaceae that includes *Cetrariastrum* Sipman, *Everniastrum* Hale *ex* Sipman, and members of *Hypotrachyna* (Vainio) Hale that were not assigned to *Remototrachyna* Divakar & A. Crespo (Crespo et al. 2011, Divakar et al. 2010). *Parmelinopsis* differs from these genera in being comprised entirely of marginally ciliate species, most of which do not have the furcate or dichotomously branched rhizines typical of *Hypotrachyna* (Hale 1975, Hawksworth et al. 2011). Recent molecular studies aimed at resolving generic boundaries within the Parmelinaceae have revealed that the circumscriptions of many genera need to be refined (Crespo et al. 2011). In the case of the genera included in the same clade as *Parmelinopsis*, it is clear that further study is needed to resolve what rank and circumscriptions are appropriate for the various groups. In treating the European species of *Parmelinopsis,* Hawksworth et al. (2011) proposed to classify them in a broadly circumscribed *Hypotrachyna*, noting "we recognize that subgeneric status might eventually prove to be appropriate for the *Parmelinopsis* clade" but that this "should be deferred pending an analysis of additional *Hypotrachyna* species".

The pragmatic treatment proposed by Hawksworth et al. (2011) is a reasonable one. Nonetheless, I would suggest that it is premature considering that *Parmelinopsis* s. str. and *Hypotrachyna* s. str. both represent strongly supported entities whose circumscriptions may simply need to be refined. Based on the available data it is plausible that some *Hypotrachyna* species, possibly the *H. revoluta* group, are in fact *Parmelinopsis* species and this genus is a valid one. Additionally, there is a large group of taxa belonging to *Hypotrachyna* s.l. that need to be carefully investigated. Therefore for the purposes of this work I prefer to retain the use of *Parmelinopsis* pending further study.

There are currently 25 accepted species included in the *Parmelinopsis* group (Adler 1992; Adler & Elix 1987; Aptroot 1991; Asahina 1951; Awasthi 1976; Benatti & Marcelli 2010; Brusse 1991; Chen et al. 2003; Divakar & Upreti 2005; Eliasaro & Adler 2000; Elix 1993, 1994; Elix & Hale 1987; Elix & Johnston 1986; Hale 1972, 1973, 1976a-d; Hale & Kurokawa 1964; Harris 1990; Krog & Swinscow 1979; Kurokawa 1968, 1979; Kurokawa & Lai 2001; Louwhoff & Elix 2000, 2002a-b; Marcelli 1993; Nash & Elix 2002; Pooprang et al. 1999; Sipman 1980; Spielmann & Marcelli 2008; Swinscow & Krog 1988; Vainio 1896; Zahlbruckner 1905, 1909), but no worldwide treatment or monograph has appeared since the

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genus was proposed. This paper aims to assist those trying to identify species belonging to this group by providing a worldwide key based on the existing literature. Other species related to the *Parmelinopsis* clade, and those of the *Hypotrachyna revoluta* group are also included, as well as some species previously interpreted as *Parmelinopsis* by some authors but that have subsequently been reassigned to other genera.

MATERIAL AND METHODS

The key presented below is mainly based on the characteristics commonly accepted for distinguishing species of this group. These include lobe width, presence or absence of vegetative propagules, the nature and characteristics of the propagules, ascospore size, details of the upper and lower cortices, and medullary chemistry.

Specimens of several species at SP were examined following standard methods for lichen taxonomic studies. The morphological and anatomical characters of the specimens were analyzed using standard stereoscopic and compound microscopes. Anatomical sections, including those of apothecia and pycnidia when present, were made with a razor blade by hand. The chemical constituents were checked by spot tests with potassium hydroxide (K), sodium hypochlorite (C) and *para*-phenylenediamine (P), and also examined under UV light (360 nm). Chemical constituents of the specimens were identified by thin-layer chromatography (TLC) using solvent C (Bungartz 2001).

The following selected specimens at SP herbarium were examined : *Parmelinopsis damaziana* (*A.A. Spielmann 994, L.S. Canêz 1092, 1096, 1115, M.P. Marcelli 24047, 34499, P. Jungbluth 829*), *P. horrescens* (*A.A. Spielmann 1319, 1821, 1848, L.S. Canêz 1131, 1132, M.P. Marcelli 10962, 33126, 33127, P. Jungbluth 847, 868*), *P. minarum* (*A.A. Spielmann 1273, 1325, L.S. Canêz 1023, 1375, M.N. Benatti 1267, 1271, M.P. Marcelli 34557, 34562, P. Jungbluth 900, 902*), *P. schindleri* (*M.N. Benatti 1018, 1021, 1064, 1088, M.P. Marcelli 19922, 10925, 10948, 10994*), *P. spathulata* (*A.A. Spielmann 1816, L.S. Canêz 750, M.P. Marcelli 34480*), *P. subfatiscens* (*M.N. Benatti 1266, 1270, 1281, M.P. Marcelli 13542, 13602*) and *P.* aff. *subfatiscens* (*L.S. Canêz 1087, M.P. Marcelli 32787, 33047, 33063, 34315, P. Jungbluth 871, 909, 1060*). The specimens cited above were collected in several vegetation types (e.g., cerrado/savannah, restinga wood, mangrove, rainforest, trees in open field, etc.) from southern and south-eastern Brazilian States, mainly Minas Gerais, Rio Grande do Sul and São Paulo.

A list of the currently accepted species of *Parmelinopsis*, including reported geographic distributions and bibliography used here for the key, is given in the appendix. The key includes several species currently treated in other genera, that once were combined in *Parmelinopsis* or that recent papers indicate are associated with the *Parmelinopsis* clade.

WORLDWIDE KEY FOR THE GENUS *PARMELINOPSIS* ELIX & HALE

1. Thallus isidiate, lacinulate, lobulate, sorediate or pustulate………………………………………………. 2
    2. Thallus isidiate and/or lacinulate or lobulate………………………………………………………… 3
        3. Thallus isidiate; lobules and lacinules absent…………………………………………………... 4
            4. Medulla C-, KC-, P-, with protolichesterinic acid………. *P. expallida* (Kurok.) Elix & Hale
            4. Medulla with at least one spot test positive, KC- or KC+ red-rose, P- or P+ orange-red….. 5
                5. Medulla P+ orange-red, with protocetraric or melanoprotocetraric acid……………… 6
                    6. Lower cortex mostly brown, with or without occasional black spots……………… ……………………………………………………. *Imshaugia venezolana* (Hale) Elix
                    6. Lower cortex usually black with black or brown margins……………………….. 7
                        7. Isidia usually simple, up to 0.3 mm high; medulla with malonprotocetraric acid……………………………………………….. *P. jamesii* (Hale) Elix & Hale
                        7. Isidia often becoming branched, up to 0.5 mm high; medulla with protocetraric acid and gyrophoric acid… *P. subinflata* (Hale) Benatti & Marcelli
                5. Medulla P-, with other substances present……………………………………………..… 8

8. Medulla C-, KC+ rose, with substances of the horrescens complex[2] where 2,4-di-*O*-methylgyrophoric acid is the major substance……………………………………..
…………………………………………………….. *P. horrescens* (Taylor) Elix & Hale
8. Medulla C+ and KC+ reddish-rose, with gyrophoric acid are the major substance……………………………………………………………………………….. 9

9. Isidia ciliate, cilia 1-2 mm long; laciniae 2-6 mm…..
.... *Parmotrema melanochaetum* (Kurok.) O. Blanco et al.
9. Isidia eciliate, only rarely with scarce cilia; laciniae 0.5-3.0 mm wide….…10

10. Laciniae 1.0-3.0 mm wide, isidia not black tipped; commonly corticolous, occasionally saxicolous……… *P. minarum* (Vain.) Elix & Hale
10. Laciniae 0.5-1.5 mm wide, isidia black tipped; saxicolous…..................
…………………………………... *P. ectypa* (Brusse) DePriest & B.W. Hale

3. Thallus isidiate-lobulate/lacinulate, or solely lobulate/laciniate……………………………… 11

11. All medullary spot tests negative, containing fatty acids (protolichesterinic or unidentified ones)……………………………………………………………………………………… 12

12. Laciniae 0.2-1.0 mm wide; thallus isidiate-lobulate; medulla containing protolichesterinic acid…………………….. *P. microlobulata* (D.D. Awasthi) Elix & Hale
12. Laciniae 1.0-3.0 mm wide; thallus lacking isidia, solely lobulate; medulla containing unidentified fatty acids…………………………………………………….……………….. 13

13. Lobules mainly laminal, dense; cilia evenly at the margins; rhizines dimorphic, simple to dichotomously branched; ascospores 11-18 × 7-9 µm……………………..
………………………………….. *P. nagalandica* (Singh & Sinha) Divakar & Upreti
13. Lobules mainly marginal, occasionally laminal; cilia mainly axillary; rhizines monomorphic, usually simple to sparsely furcate; ascospores ca. 12 × 8 µm…………
……………………………………………….. *P. heteroloba* (Zahlbr.) Elix & Hale

11. Medullary spot tests C+ and KC+ reddish rose (gyrophoric acid) or C- and KC+ rose ("horrescens complex")……………………………………………………………………… 14

14. Thallus lacinulate, without isidia initials; medulla C- and KC+ rose ("horrescens complex")……………………………………………. *P. schindleri* (Hale) Elix & Hale
14. Thallus isidiate-lobulate, also with laminal lobules; medulla C+ and KC+ reddish rose (gyrophoric acid)…………………………………….. *P. spathulata* (Kurok.) Elix & Hale

2. Thallus pustulate and/or sorediate……………………………………………………………….. 15

15. Pustules present; soredia present or absent, position variable……………………………….. 16

16. Pustules marginal; medulla K-, C-, KC-, P-, fatty acids present…………………………...
……………………………………... *P. pinguiacida* (Louwhoff & Elix) Marcelli & Benatti
16. Pustules laminal; medulla K+ yellow→red and P+ orange, C+ and KC+ or KC+ reddish rose, fatty acids absent……….. 17

17. Pustules frequently ciliate, eroding but not sorediate, exposing the lower cortex; medulla C-, KC+ rose, with substances of the "horrecens complex"……………………
…………………………………………………... *P. subfatiscens* (Kurok.) Elix & Hale
17. Pustules always eciliate, sometimes eroding into soredia, not exposing the lower cortex; medulla K+ yellow→red and P+ orange ,C+, KC+ reddish rose or C-, KC+ rose, with salazinic, gyrophoric, hiascic or olivetoric acids …...………………………….. 18

18. Rhizines simple to partially furcate, frequent…………………………………...19

19. Medulla at least partially yellowish, K- and P-, C+ and KC+ reddish rose, with gyrophoric acid and an unknown UV+ blue-white substance, TLC)……………...…………………………..*P. spumosa* (Asahina) Elix & Hale

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[2] Throughout the key "horrescens complex" refers to 3-methoxy-2,4-di-*O*-methylgyrophoric acid, 2,4-di-*O*-methylgyrophoric acid, gyrophoric acid, 5-*O*-methylhiascic acid, 4,5-di-*O*-methylhiascic acid, lecanoric acid, and 3-hydroxygyrophoric acids.

19. Medulla entirely white, K- or + yellow→red and P- or + orange, C- and KC+/- fleeting purple, with salazinic and lobaric acids ……………………………………………………………………………………. *P. swinscowii* (Hale) Hale

18. Rhizines dichotomously branched, abundant; (medulla white with gyrophoric acid, combined or not with hiascic acid)………………………………………….. 20

20. Laciniae 1.5-2.5 mm wide; pustules not eroding into soredia, medulla with olivetoric acid (only known from Madagascar)……….. *P. megadactyla* Aptroot
20. Laciniae (1-) 2-5 mm wide; pustules always eroding into soredia; medulla with gyrophoric or barbatic acids…………………………………………….. 21

21. Lobe tips maculate; pustulae not sorediate……………………………… …………………………………………….. *Hypotrachyna showmanii* Hale
21. Lobe tips emaculate; pustulate-sorediate……………………………. 22

22. Soralia spreading, diffuse, mainly laminal; rhizines sparingly branched……………. *P. afrorevoluta* (Krog & Swinscow) Elix & Hale
22. Soralia subcapitate, subapical; rhizines densely branched………. 23

23. Thallus corticicolous; soralia with gray soredia……………. 24

24. Medulla, C+ and KC+ reddish rose, with gyrophoric acid……………………… *Hypotrachyna revoluta* (Flot.) Hale
24. Medulla C+ and KC+ orange, with barbatic acid……. …………………………..*Hypotrachyna exsecta* (Taylor) Hale

23. Thallus saxicolous; soralia with dark soredia………………….. …..………………. *P. britannica* (D. Hawksworth & P. James) Elix

15. Soredia present, in subapical, capitate, erumpent soralia; (true) pustules absent……………. 25

25. Laciniae 3-5 mm wide; thallus with; medulla K+ yellow→red, P+ orange, with salazinic acid……………………………………………………….. *P. radiculata* (Kurok.) Elix & Hale
25. Laciniae 1-3 mm wide; medulla C+ rose, KC+ redish rose, with gyrophoric acid……….. ………………………………………………………… *P. cryptochlora* (Vain.) Elix & Hale

1. Thallus lacking isidia or soredia (some species can eventually be lobulate)…………………………… 26

26. Medulla with fatty acids, all tests negative (upper cortex eventually lobulate)…………………... 27

27. Ascospores ca. 12 × 8 µm; Brazil…................................... *P. heteroloba* (Zahlbr.) Elix & Hale
27. Ascospores 11-18 × 7-9 µm; India............… *P. nagalandica* (Singh & Sinha) Divakar & Upreti

26. Medulla with at least one positive spot test……………………………………………………….. 28

28. Medulla K+yellow→red, C-, KC+ rose, P+ orange yellow, containing salazinic acid………… ……………………………………………………… *P. cleefii* (Sipman) V. Marcano & Sipman
28. Medulla K-, C+ or C-, KC+ rose or reddish rose, P-, containing gyrophoric acid or the “horrescens complex”…………………………………………………………………………… 29

29. Medulla C-, KC+ rose, containing the “horrescens complex”……………………………30

30. Thallus corticolous; ascospores 12-18 × 8-12 µm…………………………………….. ……………………………………………………… *P. damaziana* (Zahlbr.) Elix & Hale
30. Thallus saxicolous; ascospores 10-13 × 5-9 µm………… *P. bonariensis* Adler & Elix

29. Medulla C+ reddish rose and KC+ reddish rose, containing gyrophoric acid and several different secondary acids……………………………………………………………………. 31

31. Thallus corticolous or saxicolous; not so, this species is often saxicolous see type; laciniae ca. 0.5-2.0 mm wide; ascospores 9-12 × 6-8 µm; medulla containing gyrophoric acid, 5-*O*-methylhiascic and 2,4,5-tri-*O*-methylhiascic acids; protolichesterinic acid absent………………………………….. *P. neodamaziana* (Elix & J. Johnst.) Elix & Hale
31. Thallus saxicolous; laciniae ca. 1.0-4.0 mm wide; ascospores 12-17 × 6-10 µm; medulla containing gyrophoric and protolichesterinic acids……………………………… …………………………………….. *P. pindarensis* (D.D. Awasthi & Singh) Elix & Hale

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APPENDIX

List of currently known *Parmelinopsis* species, their basyonyms and their known geographic distributions. Entries for those species either 1) previously treated in *Parmelinopsis* but not transferred elsewhere or 2) belonging to *Parmelinopsis* based on molecular data but not combined in the genus, are provided at the end of the list.

SPECIES CURRENTLY INCLUDED IN PARMELINOPSIS

Parmelinopsis afrorevoluta (Krog & Swinscow) Elix & Hale (≡ *Parmelia afrorevoluta* Krog & Swinscow) – **Oceania**: Australia, New Zealand, Papua New Guinea; **Asia**: China, India, Turkey; **Europe**: France, Germany, Portugal; **Africa**: Ethiopia, Kenya, Tanzania, Uganda; **South America**: Argentina, Bolivia (Adler & Elix 1992, Cheng et al. 2003, Divakar & Upreti 2005b, Flakus et al. 2003, Lendemer & Harris 2006, Masson 2005, Swinscow & Krog 1988, Yazici & Aslan 2006).

P. bonariensis Adler & Elix – **South America**: Argentina (Adler & Elix 1987).

P. britannica (D. Hawksw. & P. James) Elix (≡ *Parmelia britannica* D. Hawksw. & P. James) – **Europe**: Great Britain (Coppins 2002, James & Hawksworth 1974, Vězda 1973).

P. cleefii (Sipman) V. Marcano & Sipman (≡ *Parmelina cleefii* Sipman) – **South America**: Venezuela (Sipman 1980, Marcano et al. 1996).

P. cryptochlora (Vain.) Elix & Hale (≡ *Parmelia cryptochlora* Vain.) – **Oceania**: Australia; **Asia**: India **North America**: United States of America; **Caribbean**: Dominica (Divakar & Upreti 2005a, Elix 2002, Hale 1976c, Harris 1990, Vainio 1896).

P. damaziana (Zahlbr.) Elix & Hale (≡ *Parmelia damaziana* Zahlb.) – **Oceania**: Australia; **Africa**: Kenya; **South America**: Brazil (Hale 1976c, Krog & Swinscow 1979, Swinscow & Krog 1988).

P. ectypa (Brusse) DePriest & B.W. Hale (≡ *Parmelia ectypa* Brusse) – **Africa**: South Africa (Brusse 1991).

P. expallida (Kurok.) Elix & Hale (≡ *Parmelia expallida* Kurok.) – **Asia**: India, Japan, Nepal, Philippines, Thailand, Taiwan; **Africa**: Tanzania (Divakar & Upreti 2005a; Elix et al. 2002; Krog 2000; Kurokawa 1968, 1993; Kurokawa & Lai 2001).

P. heteroloba (Zahlbr.) Elix & Hale (≡ *Parmelia heteoloba* Zahlb.) – **South America**: Brazil (Hale 1976c).

P. horrescens (Taylor) Elix & Hale (≡ *Parmelia horrescens* Taylor) – **Oceania:** Australia, New Zealand; **Asia:** China, India, Indonesia, Japan, Philippines, Taiwan; **Europe:** France**,** Ireland, Spain; **Africa:** Azores, Kenia, South Africa; **North America**: Mexico, United States of America; **Central America**: Cuba, Dominican Republic, Guatemala, Haiti, Panama; **South America**: Argentina, Brazil, Uruguay, Venezuela (Calvelo & Liberatore 2002; Divakar & Upreti 2005; Eliasaro 2001; Eliasaro & Adler 2000; Elix 1994; Esslinger & Egan 1995; Hale 1976c; Kurokawa & Lai 2001; Marcelli 1993, 2004; Osorio 1992; Pereira & Marcelli 1989; Purvis et al. 1992; Ribeiro 1998; Spielmann 2006; Spielmann & Marcelli 2008; Swinscow & Krog 1988).

P. jamesii (Hale) Elix & Hale (≡ *Parmelia jamesii* Hale) – **Oceania**: Australia, New Zealand; **South America**: Brazil (Marcelli 1993).

P. megadactyla Aptroot – **Africa**: Madagascar (Aptroot 1991).

P. microlobulata (D.D. Awasthi) Elix & Hale (≡ *Parmelia microlobulata* D.D. Awasthi) – **Asia**: China, India, Thailand (Awasthi 1977, Chen et al. 2003, Divakar & Upreti 2005a, Pooprang et al. 1999).

P. minarum (Vain.) Elix & Hale (≡ *Parmelia minarum* Hale) – (most references as *Parmelia dissecta* Nyl.or *Parmelina dissecta* Nyl. Hale) **Oceania**: Australia, New Zealand, Papua New Guinea; **Asia**: India, Indonesia, Hawaii, Japan, Malaysia, Nepal, Philippines, Sri Lanka, Taiwan, Thailand; **Africa**: Ethiopia, Kenia, South Africa, Swaziland, Tanzania, Uganda; **Europe**: France, Portugal, Spain; **North America:** Mexico**,** United States of America; **Central America**: Cuba, Dominica, Guadeloupe, Jamaica, Martinique, Panama, St. Vicent, Trinidad; **South America**: Argentina, Brazil, Colombia, Uruguay, Venezuela (Calvelo & Liberatore 2002; Chen et al. 2003; Elix 1994, Eliasaro & Adler 2000; Esslinger & Egan 1995; Hale 1976c; Krog & Swinscow1979; Kurokawa 1993; Kurokawa & Lai 2001; Louwhoff & Elix 2002a; Marcelli 1993, 2004; Osorio 1975; Pooprang et al. 1999; Purvis et al. 1992; Ribeiro 1998; Spielmann 2006; Spielmann & Marcelli 2008; Swinscow & Krog 1988; Zahlbruckner 1930).

P. nagalandica (Singh & Sinha) Divakar & Upreti (≡ *Parmelia nagalandica* Hale) – **Asia**: India (Divakar & Upreti 2005a).

P. neodamaziana (Elix & J. Johnst.) Elix & Hale (≡ *Parmelina neodamaziana* Elix & J. Johnst.) – **Oceania**: Australia (Elix 1994, Elix & Johnston 1986, Kantvilas & Elix 1992).

P. pindarensis (D.D. Awasthi & Singh) Elix & Hale (≡ *Parmelia pindarensis* D.D. Awasthi & Singh) – **Asia**: India (Awasthi 1976, Divakar & Upreti 2005)

P. pinguiacida (Louwhoff & Elix) Marcelli & Benatti (≡ *Bulbothrix pinguiacida* Louwhoff & Elix) – **Oceania**: New Caledonia (Louwhoff & Elix 2000a) and Rarotonga (Louwhoff & Elix 2000b).

P. radiculata (Kurok.) Elix & Hale (≡ *Parmelia radiculata* Kurok.) – **Oceania**: Australia, Papua New Guinea (Elix 1994).

P. schindleri (Hale) Elix & Hale (≡ *Parmelina schindleri* Hale) – **South America**: Brazil (Hale 1976c).

P. spathulata (Kurok.) Elix & Hale (≡ *Parmelia spathulata* Kurok.) – **Africa**: Kenya, South Africa, Tanzania (Hale & Kurokawa 1964, Hale 1976c, Swinscow & Krog 1988).

P. spumosa (Asahina) Elix & Hale (≡ *Parmelia spumosa* Asahina) – **Oceania:** Australia, New Zealand; **Asia:** China, India**,** Indonesia, Japan, Taiwan; **Africa**: Kenya, Madagascar, South Africa; **North America**: Mexico, United States of America; **Caribbean**: Cuba, Jamaica; **South America:** Brazil, Chile, Colombia, Venezuela (Asahina 1951; Divakar & Upreti 2005; Eliasaro & Adler 2000; Elix 1994; Galloway 1985; Hale 1976c; Lendemer & Harris 2006; Marcelli 1993, 2004; Singh & Sinha 1994; Swinscow & Krog 1988; Wu et al. 1986).

P. subfatiscens (Kurok.) Elix & Hale (≡ *Parmelia subfatiscens* Kurok.) – **Oceania**: Australia, New Zealand; **Africa**: Kenya, South Africa, Tanzania, Uganda; **North America**: United States of America (), **Caribbean** Dominica, Panama; **South America**: Argentina, Brazil (Brodo et al. 2001; Calvelo & Liberatore 2002; Elix 1994; Hale 1971, 1976c; Hale & Kurokawa 1964; Marcelli 2004; Swinscow & Krog 1988).

P. subinflata (Hale) Benatti & Marcelli (≡ *Parmelia subinflata* Hale) – **Oceania**: Australia, Papua New Guinea; **Asia**: Philippines, Malaysia (Elix 1993, as the synonym *P. protocetrarica* Elix; Hale 1965, 1976a,1976b; Sipman 1993; Streimann 1986).

P. swinscowii (Hale) Elix & Hale (≡ *Parmelia swinscowii* Hale) – **Oceania**: New Zealand; **Africa**: Ethiopia, Kenya; **South America**: Argentina, Chile (Adler & Calvelo 1993, Elix et al. 1991, Hale 1976c, Swinscow & Krog 1988).

SPECIES BELONGING TO PARMELINOPSIS BUT NOT YET COMBINED THERE

Hypotrachyna exsecta (Taylor) Hale (≡ *Parmelia exsecta* Taylor) – **Oceania**: Australia, South Pacific islands; **Asia**: China, India, Nepal, Thailand, Taiwan (Chen et al. 2003; Divakar & Upreti 2005; Elix 1994b, 2001; Kurokawa 1986, 1993; Kurokawa & Lai 2001; Pooprang et al. 1999 [as *H. adjunta*], Wu et al. 1986).

H. revoluta (Flörke) Hale (≡ *Parmelia revoluta* Flörke) – **Asia**: India, Indonesia, Japan, Nepal, Taiwan; **Europe**: Germany, Scandinavia; **Africa**: Ethiopia, Kenya, South Africa, Tanzania; **North America**: United States of America; **Caribbean**: Dominican Republic; **South America**: Argentina, Bolivia, Chile, Venezuela (Adler & Elix 1992, Hale 1975, Divakar & Upreti 2005, Kurokawa 1993, Kurokawa & Lai 2001, Swinscow & Krog 1988).

H. showmanii Hale – **North America**: United States of America (Hale 1976d, Lendemer & Harris 2006).

SPECIES PREVIOUSLY TREATED IN PARMELINOPSIS BUT NOW COMBINED ELSEWHERE

Imshaugia venezolana (Hale) Elix (≡ *Pseudoparmelia venezolana* Hale, ≡ *Parmelinopsis venezolana* (Hale) DePriest & B.W. Hale) – **South America**: Venezuela (Hale 1976b).

Parmotrema melanochaetum (Kurok.) O. Blanco, A. Crespo, Divakar, Elix & Lumbsch (≡ *Parmelia melanochaeta* Kurok., ≡ *Parmelinopsis melanochaeta* (Kurok.) Elix & Hale) – **Oceania**: Australia; **South America**: Brazil, Colombia, Paraguay (Elix 1993 [as *Canomaculina melanochaeta*], Hale & Kurokawa 1964, Hale 1976c [as *Parmelina melanochaeta*]).

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Studes in lichens and lichenicolous fungi – no. 16

JAMES C. LENDEMER[1] AND RICHARD C. HARRIS[2]

ABSTRACT. – The type material of *Bacidia leucampyx* was examined and the name found to be conspecific with *B. schweinitzii*. It is formally placed in synonymy with *B. schweinitzii*. Examination of the type and original material of *Pertusaria shenandoensis* revealed the name is based on immature specimens of *Pertusaria plittiana*. The chemical variability of *P. plittiana* is discussed and the name *P. shenandoensis* is placed in synonymy with *P. plittiana*. The following taxa are reported for the first time from North America: *Arthonia colombiana* (on *Cladonia* species from Maine, U.S.A. and Quebec, Canada), *A. coronata* (on *Cladonia digitata, Flavoparmelia caperata*, and *Parmeliopsis hyperopta* in Maine, U.S.A. and Quebec, Canada), and *Rosellinula haplospora* (on *Aspicilia cinerea* from the Yukon Territory, Canada).

INTRODUCTION

During the course of routine organizational work in the herbarium of The New York Botanical Garden (NY) in 2012 we uncovered new information relating to two poorly understood and overlooked names of lichens described from eastern North America: *Bacidia leucampyx* (Tuck.) Dodge and *Pertusaria shenandoensis* Dibben. Review of the literature and loans of material from other herbaria allowed us to finally resolve the identity of these names. We present the results of our findings in the present contribution, which continues the series which ended last with the publication of Knudsen et al. (2011). In addition to the resolution of two little used names we report three lichenicolous fungi for the first time from North America, based on material collected during recent fieldwork.

MATERIAL AND METHODS

This study is based primarily on specimens collected by the authors and deposited in the herbarium of the New York Botanical Garden (NY). In addition to this material, specimens were borrowed on loan from DUKE, FH, HBG and US. Chemical and morphological investigations were carried out using the methods outlined in detail by Lendemer et al. (2008).

TAXONOMIC SECTION

1. *Arthonia colombiana* Etayo, Bibliotheca Lichenologica 84: 23. 2002. TYPE: **COLOMBIA:** Nariño, Pasto, Serranía de Morasurco, 3000-3300 m, en *Cladonia* sp, 25.vii.1998, *J. Etayo 15934* (COL[n.v.], holotype; hb. Etayo[n.v.], isotype).

DISCUSSION. – The lichenicolous species *Arthonia colombiana* (fig. 1) is here reported for the first time from North America. It is the only lichenicolous *Arthonia* with orange ascomatal pigment (KOH+ red purple) reported to occur on *Cladonia* squamules. The ascospores are 1-septate, soon becoming dark and warted, and 13-16 x 5-6 µm in size (12-15 x 4.5-5.5 µm fide Etayo (2002)). In North American material the ascomata are orangish to dark brown and the host squamules appear bleached around the ascomata apparently due to the death of the *Cladonia* photobiont and replacement by scattered filaments of

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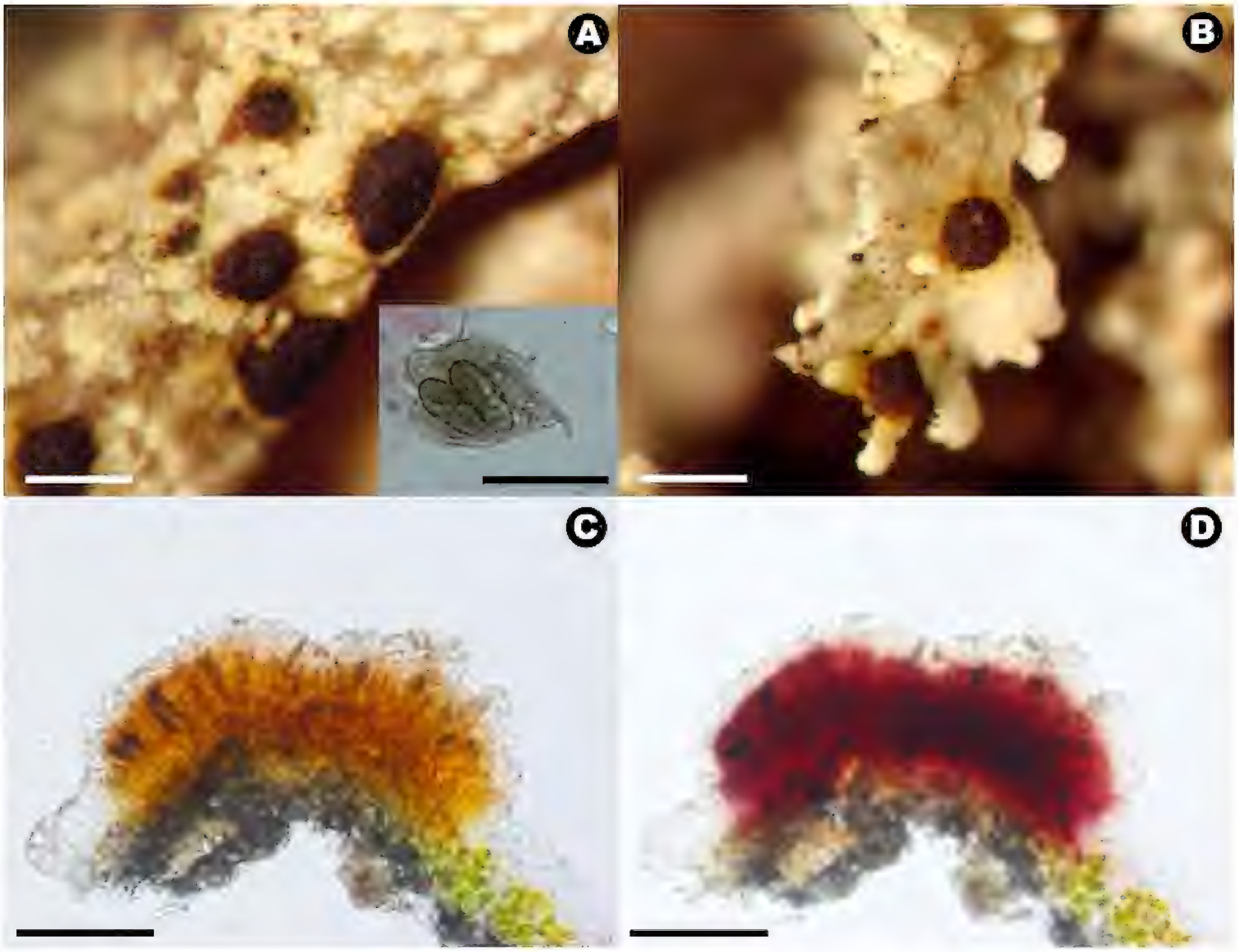

Figure 1, *Arthonia colombiana* (*Buck 53854*: A and B; *Harris 57525*: A[inset], C and D). A-B, infection on podetia (A) and squamule (B) of a host thallus of *Cladonia squamosa*, note the yellowish-orange discoloration around the apothecia where *A. colombiana* appears to form a thallus. A[inset], ascospores. C-D, cross section of apothecium mounted in water (C) and then flooded with KOH (D). Scales = 0.25 mm: A and B; 100 µm: C and D; 20 µm A[inset].

Trentepohlia. Scottish material of this taxon was also found to be associated with *Trentepohlia* and as such *A. colombiana* was proposed to be a "lichenicolous lichen" by Coppins and Aptroot (2009).

Arthonia colombiana was described from unidentified *Cladonia* species occurring at high elevations in Colombia (Etayo 2002). It has also been reported from Scotland where it was found on *C. pyxidata* (L.) Hoffm. and *C. squamosa* Hoffm. (Coppins & Aptroot 2009). The North American populations we have encountered are most commonly on *C. squamosa*, although the species has also been found on *C. ochrochlora* Flörke. Based on the available material, and the previous literature reports, it appears that this species has an oceanic distribution in the Northern Hemisphere (e.g., Clerc & May 2007, Degelius 1935, Jørgensen 1996).

Specimens examined. – **CANADA. QUEBEC**. M.R.C. DE LA HAUTE-GASPÉSIE: Parc national de la Gaspésie, along Sentier de la Grande Traversée Ouest, from parking for Chute Sainte-Anne to ca. 1.5 km along Rivière Sainte-Anne, *Thuja-Abies balsamea* forest along river, 4.vii.2012, on *Cladonia squamosa*, *R.C. Harris 57651* (NY). **U.S.A. MAINE**. HANCOCK CO.: Rt. 182, west of Rt. 1, trail to Tunk Mountain, near Salmon Pond and Mud Pond, *Acer rubrum*, *Picea rubens*, *Tsuga canadensis*, 97 m, 1.ix.2001, on *C. squamosa*, *M.S. Cole 9254* & *D. Hawksworth* (NY). WASHINGTON CO.: Town of Beals, Great Wass Island Preserve, *Picea rubens-Abies balsamea* coastal forest, 29.vi.2012, on *C. squamosa*, *R.C. Harris 57522* (NY), on *C. ochrochlora*, *R.C. Harris 57525* (NY); Town of Cutler, Cutler Public Reserve Land, Coastal Trail, SE of ME 191, ca. 3 mi NE of village of Cutler, mixed conifer-hardwood forest, 4.vii.2008, on *C. squamosa*, *W.R. Buck 53854* (NY).

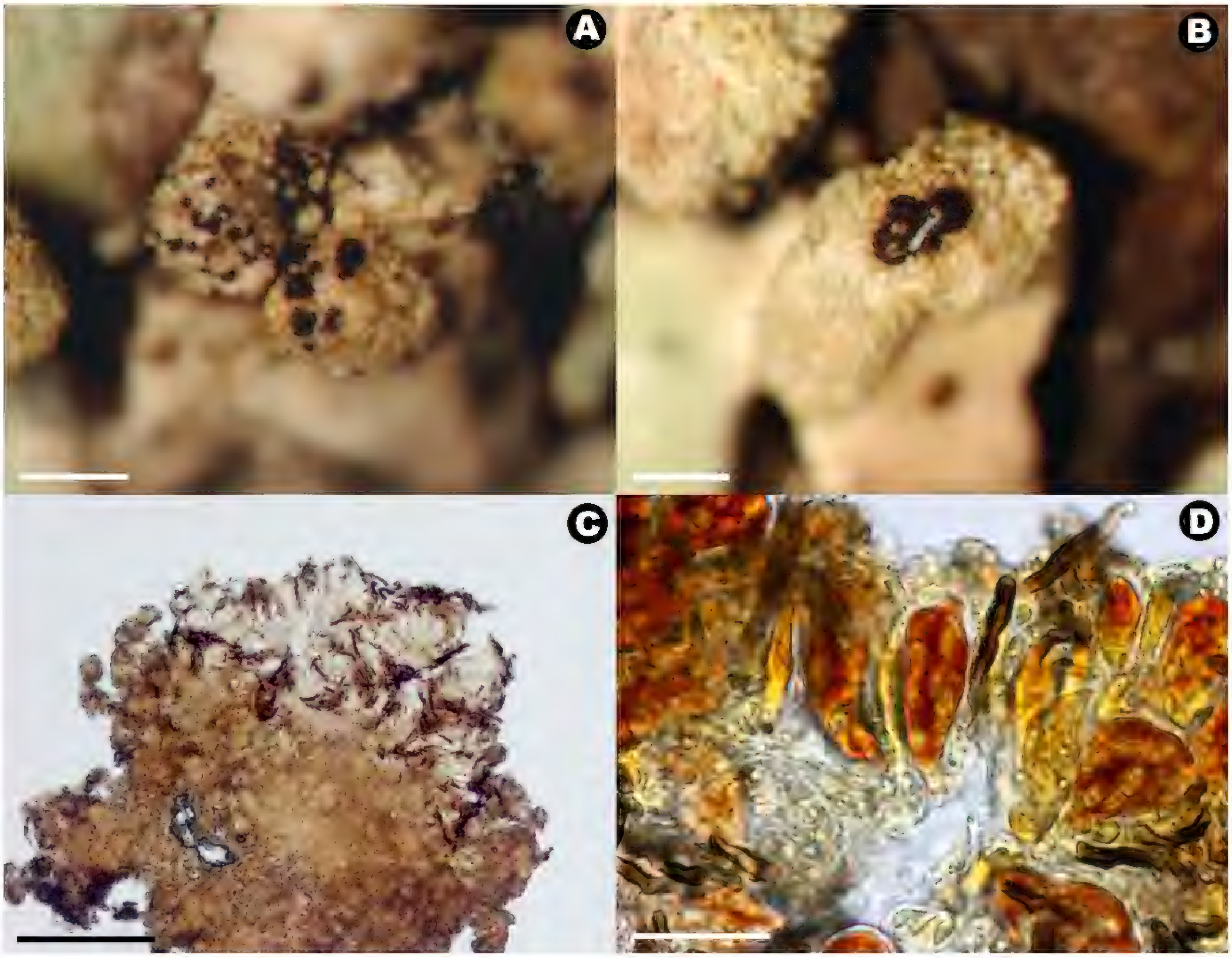

Figure 2, *Arthonia coronata* on *Parmeliopsis hyperopta* (all from *Harris 57546*). A-B, infection developed on soralia of the host thallus. C, squash mount of apothecium and associated thallus tissue from the host. D, asci, ascospores, fragmented spines mounted in IKI. Scales = 0.25 mm: A and B; 100 µm: C; 20 µm: D.

2. *Arthonia coronata* Etayo, Bull. Soc. Linn. Provence 47: 95. 1996. TYPE: **FRANCE**: Fôret Communale de St.-Pée-sur-Nivelle, St.-Pée, 6.iii.1994, sobre *F. caperata* en viejos robles de fonde de valle, *J. Etayo 12603* (MA-Lich[n.v.], holotype; hb. Etayo[n.v.], isotype).

DISCUSSION. – *Arthonia coronata* (fig. 2), a distinctly odd lichenicolous fungus, is here newly reported for North American. The species is immediately recognizable by the black ascomata bristling with short brown setae and by growing among the soredia of various host lichens. The ascospores are 1-septate, colorless to pale brown, and 11-14 x 3.5-5 µm in size (Etayo 1996). Etayo (1996) discussed the possibility that *A. coronata* may not be correctly placed in *Arthonia* which seems probable since the setose ascomata are unique. It is tempting to speculate that the setae serve to anchor the ascomata to the highly unstable soredia. *Arthonia coronata* was described from the soralia of *Flavoparmelia caperata* (L.) Hale and the two collections from Maine are also on this host. Etayo (1996) reported it from France, Spain and the Canary Islands (Gomera). It has since been found in Scotland on *Cladonia ochrochlora* Flörke and *C. subulata* (L.) F. H. Wigg. (Coppins & Aptroot 2009). The specimens from Quebec that we have examined were found on C. *digitata* (L.) Hoffm. and the soralia of *Parmeliopsis hyperopta* (Ach.) Arnold. The only unifying theme as regards host taxa seems to be the production of soredia. As is the case for *A. colombiana* reported above, based on the available data *A. coronata* appears to have an oceanic distribution in the Northern Hemisphere.

Specimens examined. – **CANADA. QUEBEC**. M.R.C. DE LA HAUTE-GASPÉSIE: Parc national de la Gaspésie, Sentier du Mont-Olivine, from parking area to slopes of Mont Olivine, coniferous forest, 2.vii.2012, on *Cladonia digitata*, *R.C. Harris 57534* (NY), on soralia of *Parmeliopsis hyperopta*,

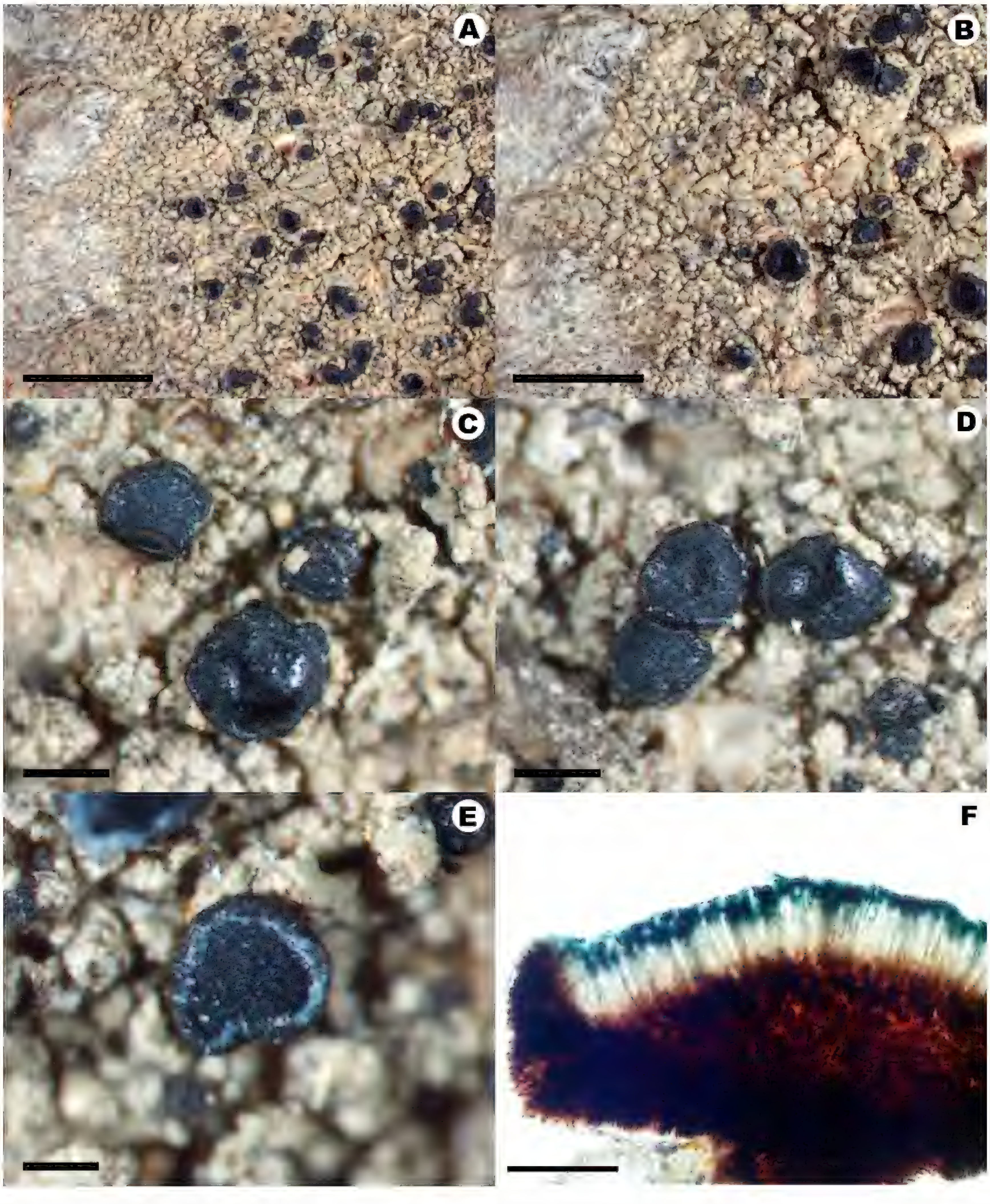

Figure 3, lectotype material of *Biatora leucampyx* (*Bumstead s.n.*, FH-TUCK!). A-B, morphology of the thallus. C-E, detail of the morphology of the apothecia, including one apothecium (E) with a pruinose margin. F, section of an apothecium mounted in water. Scales: 2.0 mm: A; 1.0 mm: B; 0.25 mm: C-E; 200 µm: F.

R.C. Harris 57546 (NY). **U.S.A. MAINE**. HANCOCK CO.: Township of T9 SD, Donnell Pond Maine Public Reserved Lands, Black Mountain Trail from Schoodic Beach parking area, wet conifer forest, 25.vi.2012, on soralia of *Flavoparmelia caperata*, *R.C. Harris 57444* (NY). WALDO CO.: Town of Lincolnville, Ducktrap River Preserve, ca. 4 mi NE of Lincolnville Center on ME 52, hardwood floodplain forest, 28.v.2009, on soralia of *F. caperata*, *R.C. Harris 55505* (NY).

3. ***Bacidia schweinitzii*** **(Fr. *ex*. Tuck.) A. Schneid.**, Guide Study Lich., p. 110. 1898.

Biatora schweinitzii Fr. *ex* Tuck. *in* Darlington, Fl. Cestrica, ed. 3, p. 447. 1853. TYPE: **U.S.A. PENNSYLVANIA.** CHESTER CO.: sine loc., on trunks, sine date, *E. Michener s.n. [Michener's Lichens, book 5, pg. 7, no. 126]* (BPI[n.v.], lectotype [selected by Ekman (1996)]).

Biatora luteola var. *schweinitzii* (Fr. *ex* Tuck.) Tuck., Gen Lich., p. 166. 1872.

Syn. nov. *Biatora leucampyx* Tuck., Syn. N. Amer. Lich., 2: 47. 1888. TYPE: **U.S.A. MASSACHUSETTS.** [WITHOUT COUNTY]: "Berkshire", 1845, *W. Bumstead s.n.* (FH-TUCK 2872 [HUH-BARCODE 00197667]!, lectotype **selected here**).

Bacidia leucampyx (Tuck.) Dodge, Rhodora, 28: 160. 1926.

DISCUSSION. – While organizing our reprint collection we came across a publication by C.W. Dodge documenting the lichens of the Gaspe Peninsula in Quebec, Canada (Dodge 1926). In reading this publication we discovered that Dodge had proposed the new combination *Bacidia leucampyx* for the name *Biatora leucampyx*. Since we were unfamiliar with both of these names we searched for them in *Index Fungorum* and on the checklist of North American lichens (Esslinger 2011), both without success. Using Dodge's citation however, we were able to locate the protologue and determine that based on the description the taxon was likely conspecific with the common eastern North American species *Bacidia schweinitzii* (Ekman 1996). In an effort to resolve the identity of this long overlooked name we borrowed the type material from the Tuckerman herbarium at FH. Examination of the only specimen filed under this name in FH-TUCK (fig. 3) confirmed our suspicion that *Bacidia leucampyx* should be treated as a synonym of *B. schweinitzii* as is formally proposed here.

It should be noted that although only a single specimen labeled *Biatora leucampyx* was located in the Tuckerman herbarium at FH we have chosen to select the specimen as the lectotype rather than simply assume its status as the holotype. This is due to the paucity of data given in the protologue, where Tuckerman stated only that he had seen material collected on beech (*Fagus*) in western Massachusetts. The precise locality, collector, and date of collection were not included in the protologue despite the presence of these data on the label associated with the lectotype. Thus we cannot conclude with certainty that Tuckerman did not have additional material available to him at the time of the description of *B. leucampyx* that was subsequently distributed to other herbaria or lost.

4. ***Pertusaria plittiana*** **Erichsen**, Repert Spec. Nov. Reg. Veg., 41: 77. 1936. TYPE: **MARYLAND.** BALTIMORE CO.: Gunpowder River, 7.vi.1910, on rocks along right bank, *C.C. Plitt 255* (HBG! lectotype [selected by Dibben (1980)]; NY!, US?[n.v.][3], isolectotypes).

Syn. nov. *Pertusaria shenandoensis* Hale & Dibben *in* Dibben, Publications in Biology and Geology, Milwaukee Public Museum, 5: 108. 1980. TYPE **U.S.A. VIRGINIA.** PAGE CO.: Shenandoah National Park, along trail to Little Stony Man (Mt.), 1.vi.1971, on rocks in sheltered woods, *M.E. Hale s.n.* (US!, holotype).

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[3] There are two specimens of *Plitt 255* at US. One of these, US Barcode 00517446[!] was annotated by Dibben in 1971 as an isoype of *Pertusaria plittiana*. Dibben's TLC annotation slip reports only norstictic acid and a trace of connorstictic acid. Our examination of this specimen revealed that it represents *Aspicilia cinerea* (L.) Korb. and not *P. plittiana* (fig 4E and F). Based on the original notes associated with this specimen, which illustrate an ascus and ascospore of typical *P. plittiana*, it is possible that the specimen that was originally present in the packet became disassociated after Dibben annotated the specimen. There is no photograph of the second specimen, US Barcode 00348614, available online however we suspect that it may represent a true isolectotype of *P. plittiana*.

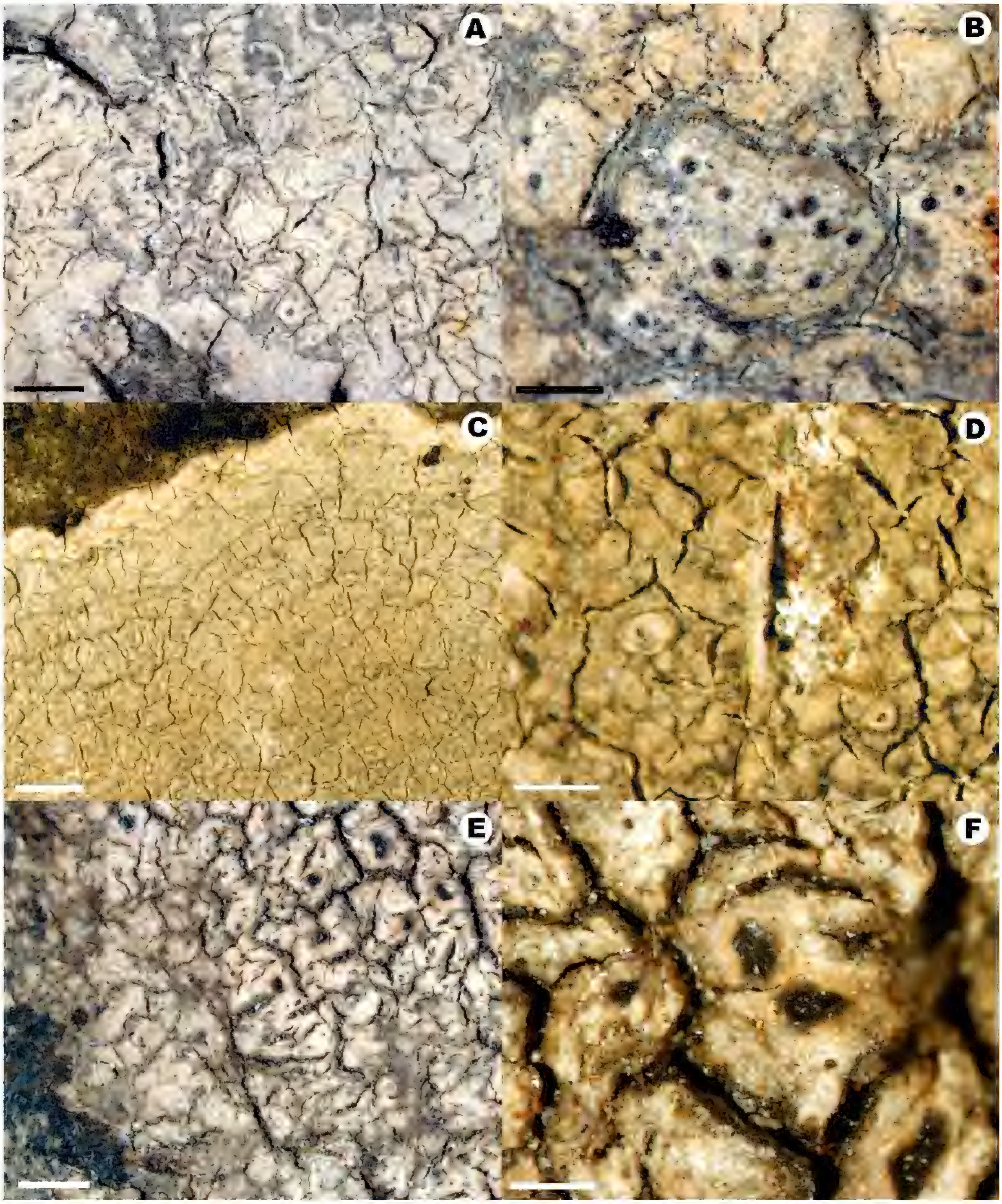

Figure 4, comparison of the lectotype of *Pertusaria plittiana* (A, thallus; B, fertile verruca), holotype of *P. shenandoensis* (C, thallus; D, sterile verrucae), and non-type specimen of *Aspicilia cinerea* at US annotated as an isotype of *P. plittiana* by Dibben (E, thallus; F, apothecia). Scale bars = 2.0 mm: C; 1.0 mm: A and E; 0.5 mm: B, D, and E.

DISCUSSION. – *Pertusaria shenandoensis* is an enigmatic taxon that has puzzled us, and evidently other authors, since the time of its description. The species was described by Dibben (1980) on the basis of several sterile specimens from the Shenandoah Mountains of Virginia in eastern North America. The protologue includes a detailed description that alludes to the presence of sterile verrucae (i.e. warts typical of *Pertusaria* s. str.). Considering our extensive collection efforts and studies of sterile crustose lichens in eastern North America, we have always wondered why we have not encountered *P. shenandoensis*. Indeed, a sterile crustose species that produces norstictic acid and gyrophoric acid would be very distinctive. Further, the existence of a lichen species endemic to a single locality in the central Appalachians seemed highly improbable. However if such a species did exist, it would certainly warrant significant conservation attention.

Recently we became aware of the online key to *Pertusaria* (Archer & Elix undated [accessed 2011]) and noticed that *P. shenandoensis* was included among the species of "uncertain status". Review of the protologue led us to wonder if, in fact, Dibben had described the species we have been referring to as *"Phlyctis petraea*". That species is common throughout the Appalachians, and one of us (JCL) had recently seen abundant material from the vicinity of the type locality of *P. shenandoensis* while visiting CANL.

Hoping that we had finally found a published name for *Phlyctis "petraea*", we borrowed the paratype of *Pertusaria shenandoensis* that had been deposited in DUKE. Study of the specimen revealed it to be a sterile thallus of the common eastern North American species *P. plittiana*. Thin Layer Chromatography (TLC) of the specimen revealed only the presence of the norstictic acid aggregate. We suspect that Dibben's (1980) report of gyrophoric acid from the species might have been the result of contamination from adjacent thalli of *Trapelia placodioides* Coppins & P. James, which could potentially resemble *P. plittiana* when young. Examination of the holotype of *P. shenandoensis* at US (figs. 4, C and D) confirmed that it has the same chemistry as the paratype at DUKE and also represents a sterile specimen of *P. plittiana* growing adjacent to young thalli of *T. placodioides*.

When Dibben (1980) described *Pertusaria shenandoensis* he compared it to *P. plittiana* but considered the two species to differ significantly in chemistry. Dibben (1980) considered *P. plittiana* to produce norstictic acid, connorstictic acid, perlatolic acid, and stenosporic acid, with the first three compounds occurring in variable concentrations. Conversely, he considered *P. shenandoensis* to produce only norstictic acid with a trace of gyrophoric acid.

The chemistry of *Pertusaria plittiana* reported by Dibben (1980) is contradicted however, by our examination of the lectotype at HBG (figs. 4A and B) and an isolectotype at NY. TLC of both specimens detected the presence of only norstictic and connorstictic acids. Thus it would seem that the type collections of *P. plittiana* and *P. shenandoensis* do not actually differ in chemistry. As such we place *P. shenandoensis* in synonymy with *P. plittiana* here.

During our fieldwork in North America we have encountered populations of *Pertusaria plittiana* whose chemistry agreed with that published by Dibben (1980) as well as populations that produced only norstictic and connorstictic acids. It should be noted that populations of *P. plittiana* with the latter chemistry have also been reported from China (Zhao et al. 2004). Here, we assert that the populations referred to *P. shenandoensis*, as well as those represented by the type collection of *P. plittiana*, likely represent a chemical variant of *P. plittiana* in which stenosporic and perlatolic acids are absent or not detectable with TLC. It would be logical to conclude that if two of the substances produced in *P. plittiana* can be present in highly variable concentrations as Dibben (1980) proposed then the remaining ones can be as well.

Additional specimen of Pertusaria shenandoensis *examined*. – **U.S.A. VIRGINIA.** PAGE CO.: Shenandoah National Park, Stoney Man Mtn., ½ mi up trail from Little Stoney Man parking lot, 10.iv.1972, on flat rock surface by trail, *M.J. Dibben 22437* (DUKE!).

5. *Rosellinula haplospora* (Nyl.) R. Sant., Syst. Ascom. 5(2): 311. 1986.

Endococcus haplosporus Th. Fr. & Almq., Bot. Notiser [unnumbered volume for 1867]: 109. 1867. TYPE: **SWEDEN:** Herjedalen, 1866, Funnesdalens kalkbrott, on *Aspicilia cinerea*, *S. Almquist s.n.* (UPS[n.v.], holotype)

Muellerella haplospora (Th. Fr. & Almq.) Arnold, Flora, Jena 57: 155. 1874.

Roselliniella haplospora (Th. Fr. & Almq.) Hafellner, Herzogia 7: 147. 1985.

DISCUSSION. – In conjunction with collection efforts aimed at understanding the genus *Lepraria* s.l. in North America JCL conducted fieldwork in the Yukon Territory of Canada. Among the interesting discoveries made during this trip was a collection of the lichenicolous fungus *Rosellinula haplospora* that had infected a thallus of *Aspicilia cinerea* (L.) Körber. This is the first report of *R. haplospora* from North America. It can easily be recognized by its peritheciate fruiting bodies with interascal filaments, polysporous asci and simple, brown ascospores (7-11 x 4.5-6.5 µm in size *fide* Hafellner (1985) and Ihlen and Wedin (2008)). Although occurring on unrelated hosts, *Muellerella polyspora* Müll. Arg. (on *Arthonia radiata* and *Opegrapha atra*; corticolous members of the Arthoniomycetes) and *M. hospitans* Stizenb. (on *Bacidia* spp. and *Lecania fuscella*; corticolous members of the Ramalinaceae) could be confused with *R. haplospora*. Both of these taxa lack interascal filaments and have differ in characters of the ascospores (*fide* Hawksworth et al. 2008); smaller (2.5-3.5(-4) x (1.5-)2-2.5 µm) and nearly subglobose in *M. hospitans*, smaller in *M. polyspora* (5-7(-9.5) x 2.5-3(-3.5) µm).

Specimen examined. – **CANADA. YUKON TERRITORY:** NW slope of Needle Mt., E of Annie Lake Rd. above N end of Annie Lake, 16.3 km W of jct of Annie Lake Rd. and Klondike Hwy. (Yukon 2), 4.vi.2011, on *Aspicilia cinerea* on rock, *J.C. Lendemer 28782* (NY).

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A new species of *Melanohalea* from the Andes Mountains in central Peru

THEODORE L. ESSLINGER[1]

ABSTRACT. – *Melanohalea peruviana* is described from the state of Ancash in central Peru, where it was collected on angiosperm twigs at high elevation (4400 m). This new species is small and fertile, with superficial similarities to *M. trabeculata*, but differs by having only eight spores per ascus and by lacking secondary substances in the medulla.

KEYWORDS. – Andes Mountains, neotropics, biodiversity hotspots, South America

INTRODUCTION

The tropical region of the Andes Mountains has been recognized as one of the major hotspots for terrestrial biodiversity (Myers et al. 2000), with one of the highest numbers of both plant and vertebrate species, also including a very large percentage of endemic species in both groups. As with many of these hot spots, the tropical Andes region has been under-collected, especially when it comes to lichens and other fungi. Nevertheless, when a particular lichen group in the area receives attention, new taxa are almost inevitably discovered (e.g., Ahti 2000, Kurokawa & Moon 2000, Lindstrom 2007, Moberg 2011).

The large and diverse family Parmeliaceae is common in the tropical latitudes of South America, with a large number of genera and species known to occur there. *Melanelixia* and *Melanohalea*, the two recently erected brown parmelioid genera in this family (Blanco et al. 2004), are primarily north temperate however, and neither genus has been reported from northern South America. It was therefore particularly noteworthy when a small, fertile, undescribed species of *Melanohalea* was encountered among a small collection of Peruvian lichens sent to me for identification from the University of Uppsala. Although only a single collection is known, the taxon is quite distinctive and is here described as new.

MATERIAL AND METHODS

The specimen was studied in dry condition under an Olympus SZ40 dissecting microscope and all microscopic characters were measured in water mounts using a Nikon Alphaphot YS2 compound microscope. The photograph was taken with a Nikon Coolpix 8700 digital camera mounted on the dissecting microscope. Thin-layer chromatography with three solvent systems was carried out using the current modifications of the standardized methods of Culberson & Kristinsson (1970) and Culberson (1972).

THE NEW SPECIES

***Melanohalea peruviana* Essl. sp. nov.**
Mycobank #802811.

FIGURE 1.

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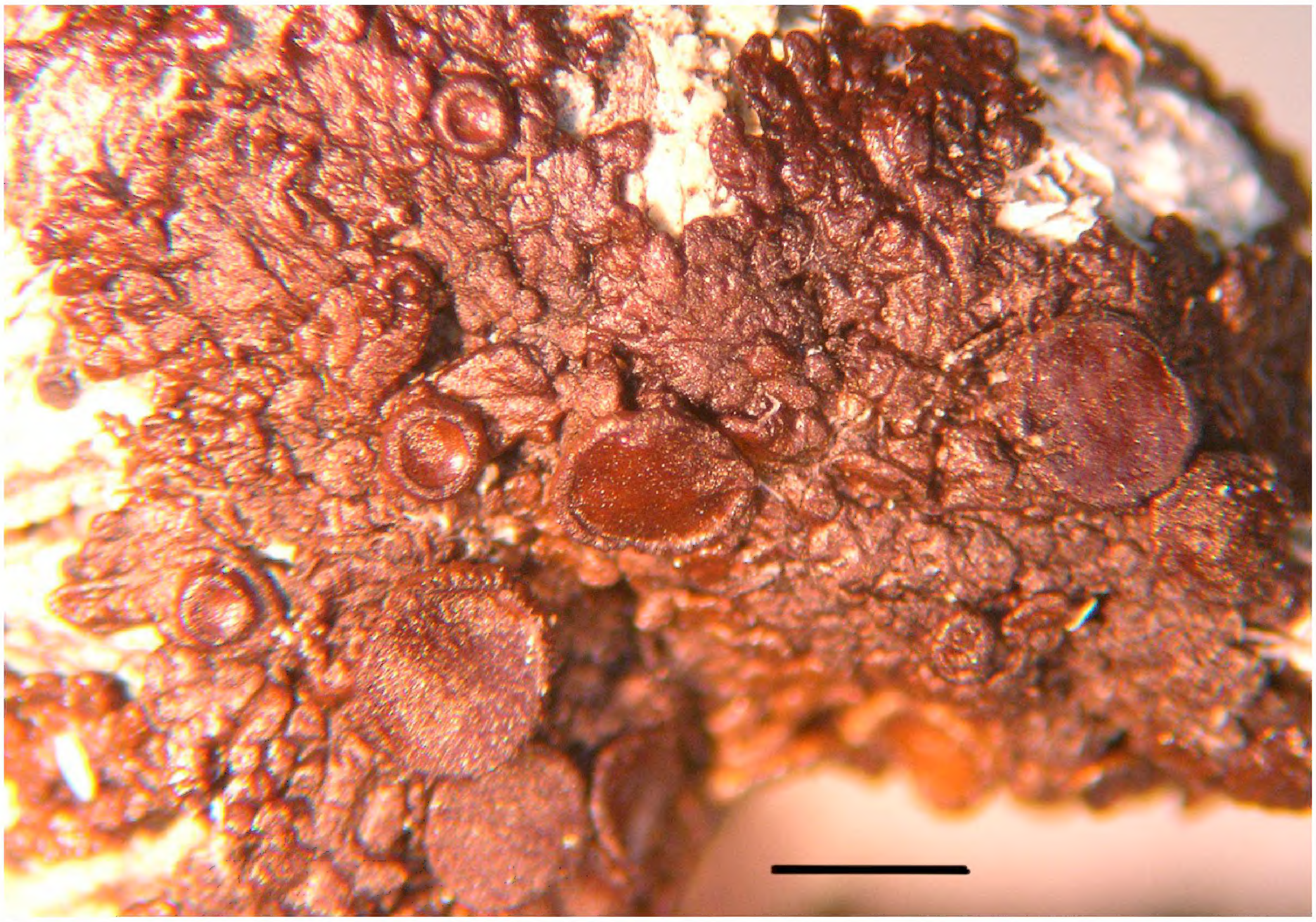

Figure 1, a portion of the holotype of *Melanohalea peruviana*. Scale bar = 1 mm.

TYPE: **PERU. ANCASH:** Huaraz, Laguna Llaca, ca. 27 km (road distance) NE of Huaraz,: 09°28S 77°28W, 4400 m., 28.ii.1981, on twigs, *R. Santesson & R. Moberg P60:52* (UPS!, holotype).

DESCRIPTION. – Thallus foliose, appressed and moderately adnate, up to ca. 1.5 cm in diameter. Lobes 0.4-1.0 mm broad, mostly flat to weakly convex, somewhat elongate and irregular, contiguous to somewhat imbricate. Upper surface brown to olive-brown, more or less smooth at edges but weakly rugose in older parts, epruinose and usually distinctly shiny, especially on the lobe ends; with sparse and very obscure pseudocyphellae (small and concolorous with the cortex); without soredia or isidia. Lower surface brown to dark brown, trabeculate more or less throughout, dull to somewhat shiny, moderately rhizinate, the rhizines more or less concolorous with the lower surface.

Apothecia common, sessile, concave when young but becoming weakly convex at maturity, up to 2 mm in diameter; margin entire to weakly crenate; hymenium 55-60 µm thick, subhymenium 28-48 µm thick; spores 8/ascus, globose or subglobose, 6-8 x 5-7 µm.

Pycnidia frequent, immersed and black; pycnoconidia cylindric to weakly acerose or fusiform, 6-7 x ca 1 µm.

CHEMISTRY. – No substances detected by TLC. Spot tests: upper cortex and medulla negative with all spot test reagents.

ETYMOLOGY. – In honor of the country of origin, Peru.

DISCUSSION. - This new species is similar in general appearance to the North American endemic *Melanohalea trabeculata* (Ahti) O. Blanco et al., because of the small, fertile thalli with a distinctly trabeculate lower surface. However, *M. peruviana* is clearly distinguished by having eight spores per ascus rather than 16-32, a more appressed and rugose thallus, and by the lack of detectable secondary compounds in the medulla. Most specimens of *M. trabeculata* have norstictic acid in the medulla and react with both K and PD, although the strength of the reactions indicates variable concentrations, and in a few specimens, no reactions or norstictic acid can be detected (Esslinger 1977). The North American taxon *M. subolivacea* (Nyl.) Blanco et al. is another fertile species lacking secondary compounds in the medulla, but that species is almost an order of magnitude larger (up to 11 or 12 cm), has larger spores (8-10.5 x 5-8 µm) and lacks a distinctly trabeculate lower surface. Similarly, the only other fertile species of *Melanohalea* known from South America (central Chile) is *M. zopheroa* (Essl.) Blanco et al., a much larger species (up to 7 cm), characterized by very conspicuous, more or less whitish pseudocyphellae, and larger spores (8-13.5 x 5.5-8 µm). Additionally the lower surface is not or only weakly trabeculate in that species.

As mentioned above, this is the first species of the primarily north temperate genus *Melanohalea* to be reported for tropical South America, although another highland tropical species was recently described from south central Mexico (Esslinger & Pérez Pérez 2010). Four species of *Melanohalea* and one species of *Melanelixia* are known from temperate South America, especially the far south (Esslinger 1977).

This is a small and inconspicuous species, known presently from only a single locality in a poorly collected region of South America. It should be searched for more broadly in high altitude areas of northern South America.

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